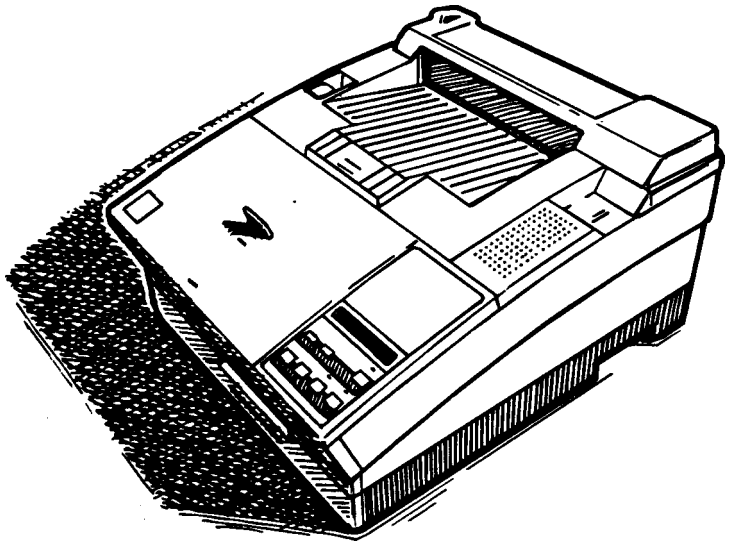
EPSON TERMINAL PRINTER

EPL-5000/5200/5200+

ActionLaser™ 1000 I15OO

SERVICE MANUAL



EPSON

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PRECAUTIONS

Precautionary notations throughout the text are categorized relative to 1) personal injury and 2) damage to equipment.

DANGER Signals a which, if could result in serious or fatal personal injury. Great caution should be exercised in performing procedures preceded by DANGER Headings.

Signals a precaution which, if ignored, could result in damage to equipment.

The precautionary measures itemized below should always be observed when performing repair/ maintenance procedures.

DANGER

1. ALWAYS DISCONNECT THE PRODUCT FROM BOTH THE POWER SOURCE AND PERIPHERAL DEVICES PERFORMING ANY MAINTENANCE OR REPAIR PROCEDURE.

   NO WORK SHOULD BE PERFORMED ON THE UNIT BY PERSONS UNFAMILIAR WITH BASIC SAFETY MEASURES AS DICTATED FOR ALL ELECTRONICS TECHNICIANS IN THEIR LINE OF WORK.

3. WHEN PERFORMING TESTING AS DICTATED WITHIN THIS MANUAL, DO NOT CONNECT THE UNIT TO A POWER SOURCE UNTIL INSTRUCTED TO DO SO. WHEN THE POWER SUPPLY CABLE MUST BE CONNECTED, USE EXTREME CAUTION IN WORKING ON POWER SUPPLY AND OTHER ELECTRONIC COMPONENTS.

WARNING

REPAIRS ON EPSON PRODUCT SHOULD BE PERFORMED ONLY BY AN EPSON CERTIFIED REPAIR TECHNICIAN.

MAKE CERTAIN THAT THE SOURCE VOLTAGE IS THE SAME AS THE RATED VOLTAGE, LISTED THE SERIAL NUMBER/RATING PLATE. THE PRODUCT HAS A PRIMARY AC RATING DIFFERENT FROM AVAILABLE POWER SOURCE, DO NOT CONNECT IT TO THE POWER SOURCE.

3. ALWAYS VERIFY THAT THE EPSON PRODUCT HAS BEEN DISCONNECTED FROM THE POWER SOURCE BEFORE REMOVING OR REPLACING PRINTED CIRCUIT BOARDS AND/OR INDIVIDUAL CHIPS.

4. IN ORDER TO PROTECT SENSITIVE MICROPROCESSORS AND CIRCUITRY, USE STATIC DISCHARGE EQUIPMENT, SUCH AS ANTI-STATIC WRIST STRAPS, WHEN ACCESSING INTERNAL COMPONENTS.

5. REPLACE MALFUNCTIONING COMPONENTS ONLY WITH THOSE COMPONENTS BY THE MANUFACTURE; INTRODUCTION — [PcMath] — [Ps OTHER NONAPPROVED COMPONENTS MAY DAMAGE THE PRODUCT AND VOID ANY APPLICABLE EPSON WARRANTY.

SAFETY INFORMATION

This printer is a page printer which operates by means of a laser. There is no possibility of danger from the laser, provided the printer is operated according to the instructions in this manual provided.

Since radiation emitted by the laser is completely confined within protective housings, the laser beam cannot escape from the machine during any phase of user operation.

For United States Users:

[Laser Safety]

This printer is certified as a Class 1 Laser product under the U.S. Department of Health and Human Services (DHHS) Radiation Performance Standard according to the Radiation Control for Health and Safety Act of 1968. This means that the printer does not produce hazardous laser radiation.

[CDRH Regulations]

The Center for Devices and Radiological Health (CDRH) of the U.S. Food and Drug Administration implemented regulations for laser products on August 2,1976. Compliance is mandatory for products marketed in the United States. The label shown below indicates compliance with the CDRH regulations and must be attached to laser products marketed in the United States.

WARNING: Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

[Internal Laser Radiation]

Maximum Radiation Power: 5.7×10^{4} (w)
Wave Length: 780 nm

This is a Class IIIb Laser Diode Assay that has an invisible laser beam. The print head unit is NOT A FIELD SERVICE ITEM. Therefore, the print head unit should not be opened under any circumstances.

For Other Countries Users;

WARNING: Use of controls, adjustments or performance of procedures other than those specified in this manual may result in hazardous radiation exposure.

This is a semiconductor laser. The maximum power of the laser diode is 5.7 x 10^{-4}W and the wavelength is 780 nm.

For Denmark Users;

ADVARSEL
Usynlig laserstråling ved åbning, når sikkerhedsafbrydere er ude af funktion.
Undgå udsættelse for stråling.

Klasse 1 laser produkt der opfylder IEC825 sikkerheds kravene.

***For Finland, Sweden* Users;**

> **VAROITUS**
> Laitteen käyttäminen muulla kuin tässä käyttöohjeessa mainitulla tavalla saattaa altistaa käyttäjän turvallisuusluokan 1 ylittävälle näkymättömälle

> **VARNING**
> Om apparaten används på annat sätt an i denna bruksanvisning specificerats, kan användaren utsättas for osynlig laserstrålning, som överskrider gränsen fi

For Norway Users;

> **ADVARSEL**
> Dersom apparatet brukes på annen måte em spesifisert i denne bruksanvisning, kan brukeren utsettes for unsynlig laserstråling som overskrider grensen for laser klasse 1.

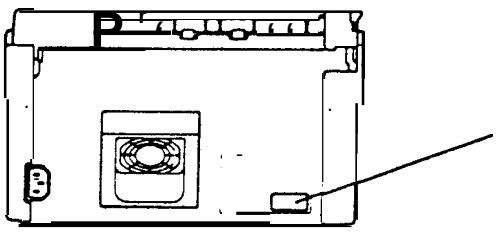
> Dette er en halvleder laser. Maksimal effeckt til laserdiode er 5.7x 10^{-4}W og bølgelengde er 780 nm.

Laser Safety Labels

[Label on rear printer case]

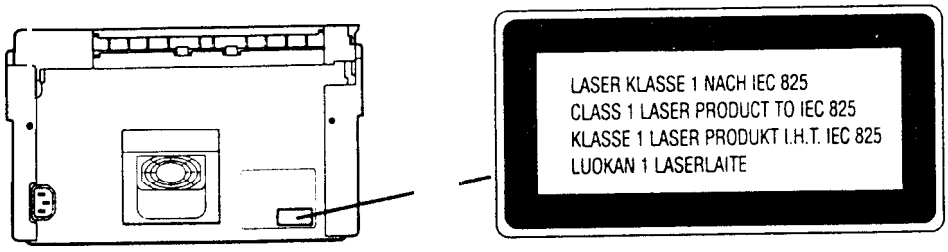
A laser safety labels is attached on the outside of the printer shown below.

For United State



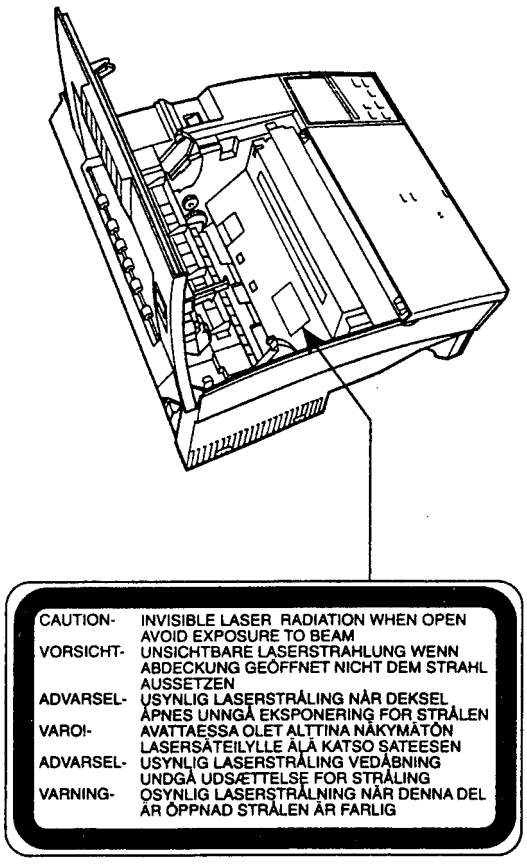
This laser product conforms to the applicable requirement of 21 CFR Chapter I, subchapter J.
SEIKO EPSON CORP.
Hirooka Office
80 Hirooka, Shiojiri-shi, Nagano-ken, JAPAN
MANUFACTURED:

For Europe



[Label inside printer]

The following laser safety label will be attached inside the printer as shown below.


CAUTION- INVISIBLE LASER RADIATION WHEN OPEN AVOID EXPOSURE TO BEAM
VORSICHT- UNSICHTBARE LASERSTRAHLUNG WENN ABDECKUNG GEÖFFNET NICHT DEM STRAHL AUSSETZEN
ADVARSEL- USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES UNNGÅ EKSPONERING FOR STRÅLEN
VARO!- AVATTAESSA OLET ALTTINA NÄKYMÄTÖN LASERSÄTEILYLLE ÄLÄ KATSO SÄTEESEN
ADVARSEL- USYNLIG LASERSTRÅLING VEDÅBNING UNDGÅ UDSÆTTELSE FOR STRÅLING
VARNING- OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD STRÅLEN ÄR FARLIG

PREFACE

This manual describes functions, theory of electrical and mechanical operations, maintenance, and repair of l /5200 and Action Laser 1000/1500.

instructions and procedures included herein are intended for the experience repair technician, and attention should be given to the precautions on the preceding page. The chapters are organized as follows:

CHAPTER 1. GENERAL DESCRIPTION

Provides a general product overview, lists specifications, and illustrates the main components of the printer.

CHAPTER 2. OPERATING PRINCIPLES

Describes the theory of printer operation.

CHAPTER 3. DISASSEMBLY AND ASSEMBLY

Includes a step-by-step guide for product disassembly and assembly.

CHAPTER 4. ADJUSTMENTS

Includes a step-by-step guide for adjustment.

CHAPTER 5. TROUBLESHOOTING

Provides Epson-approved techniques for adjustment.

CHAPTER 6. MAINTENANCE

Describes preventive maintenance techniques and lists lubricants and adhesives required to service the equipment.

APPENDIX

Describes connector pin assignments, circuit diagrams, circuit board component layout and exploded diagram.

The contents of this manual are subject to change without notice.

REVISION SHEET

Revision	Issue Date	Revision Page
Rev. A	January 8, 1993	1st issue
Rev. B	June 28,1993	Page 1-23, 1-31,2-22,3-11 ,4-1
Rev. C	August 5, 1993	Added information for the Cl 08 MAIN-B board: Page B-i, B-1, through B-10
Rev. D	February 28, 1994	Page 1-33
Rev. E	April 4, 1995	Added information for the EPL-5200+: Page C-i, C-1 through C-10

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Chapter 1 General Description

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1.1 FEATURES

The EPL-5000/5200 and the ActionLaser 1000/1500 are non-impact page printers that combine a semi-conductor laser with electro-photographic technology. These printers are small and light, and feature high-speed, high-resolution printing. Also, maintenance is very easy, as a result of various built-in diagnostic functions. The main features are:

- No ozone
- Printing speed —6 PPM
- Resolution —3W DPI
- Light weight — about 10 kg (22 lb.)
- Small footprint
- c1 Face-down tray (standard) /face-up tray (optional)
- High-performance controller (the controller's CPU is a 16.67 MHz Motorola 68000)
- Easy maintenance
- EPL-5000/ActionLaser 1000 has HP LaserJet® 11P emulation mode
- EPL-5200/ActionLaser 1500 has HP LaserJet® III/IIIP/IIISi emulation mode
- EPL-5000/ActionLaser 1000 can be upgraded from HP LaserJet® IIP mode to LaserJet® III/IIIP/IIISi emulation mode with the optional Epson PCL5 /RITech Upgrade Board
- Optional PostScript™ IC card
- Optional Epson GL identity IC card
- High-speed serial communication rate of 38400 bps (except for the ActionLaser 1000)
- A multi-user, multi-emulation mode
- Various types of fonts available in font cards and cartridges
- IES (Intelligent Emulation Switch) allows switching of the printer mode between PostScript™ mode and another mode
- SPL (Shared Printer Language) enables switching of the printer mode by command
- In the EPL-5200/ActionLaser 1500 and in the EPL-5000/ActionLaser 1000 with the optional Epson PCL5/RITech Upgrade Board, Resolution Improvement Technology (RITech) refines the print quality by eliminating jagged edges from images and characters.

Figure 1-1 shows an exterior view of the EPL-5000/5200 and ActionLaser 1000/1500.

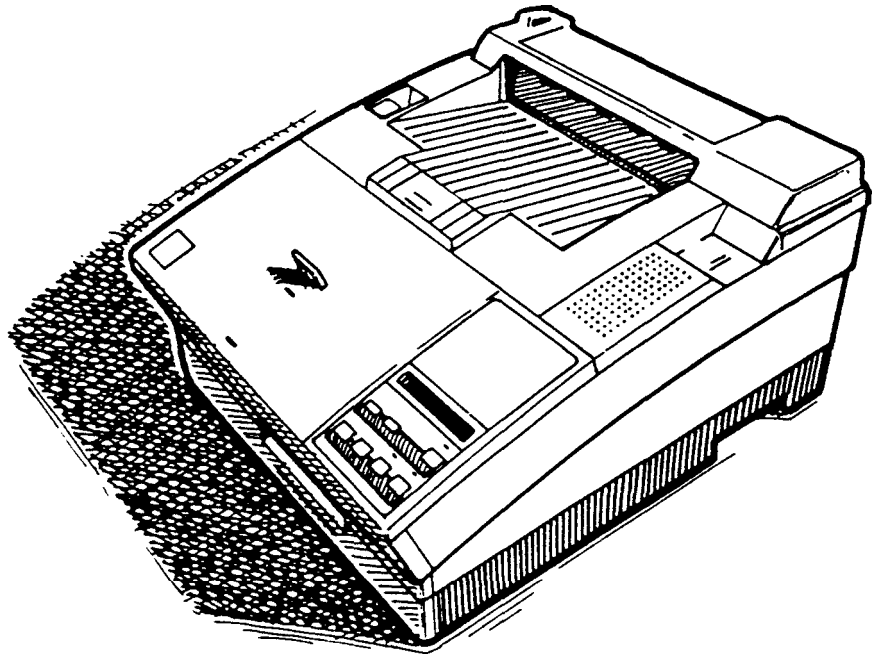


Figure 1-1. Exterior View of the EPL-5000/5200 and Action Laser 1000/1500

Table 1-1 shows the differences in features for the EPL-5000, ActionLaser 1000, EPL-5000 with the optional Epson PCL5/RITech Upgrade Board, ActionLaser 1000 with the optional Epson PCL5/RITech Upgrade Board, EPL-5200, and ActionLaser 1500.

Table 1-1. Differences in Features

Function/ Specification	EPL-5000	Action Laser 1000	EPL-5000 with PCL5® Board	Action Laser 1000 with PCL5® Board	EPL-5200	Action Laser 1500
HP LaserJet® Emulation Level	LaserJet® IIP (PCL4®)	LaserJet® IIP (PCL4®)	LaserJet® 111/IIIP/IIISi (PCL5®)	LaserJet® III/IIIP/IIISi (PCL5®)	LaserJet® 111/IIIP/IIISi (PCL5®)	LaserJet® III/IIIP/IIISi (PCL5®)
GQ mode	Optional	No	Optional	No	Optional	No
Local Language ROM	No	No	Optional	No	Optional	No
Standard RAM Size	0.5MB	0.5MB	0.5MB	0.5MB	1.OMB	1.OMB
Maximum RAM Size (Optional RAM chips installed)	6.5MB	6.5MB	6.5MB	6.5MB	5.0MB	5.0MB
Standard I/F	Parallel/ RS-232C	Parallel	Parallel/ RS-232C	Parallel	Parallel/ RS-232C	Parallel/ RS-232C
Optional I/F Cards	Type-B I/F Cards (Except C82305*, C82306* and C82313*)	Type-B I/F Cards (Include C82305* & C82306* and except C82313*)	Type-B I/F Cards (Except C82305*, C82306* and C82313*)	Type-B I/F Cards (Include C82305* & C82306* and except C82313*)	Type-B I/F Cards (Except C82305*, C82306* and C82313*)	Type-B I/F Cards (Except C82305*, C82306* and C82313*)
RITech	No	No	Yes	Yes	Yes	Yes
Resident Bitmap Fonts	9 Portrait Fonts and None Landscape Fonts (Note)	9 Portrait Fonts and None Landscape Fonts (Note)	9 Portrait Fonts and 7 Landscape Fonts	9 Portrait Fonts and 7 Landscape Fonts	9 Portrait Fonts and 7 Landscape Fonts	9 Portrait Fonts and 7 Landscape Fonts
Resident Scalable Fonts	No	No	13 fonts	13 fonts	13 fonts	13 fonts

Note: Landscape fonts are generated from portrait fonts by firmware.

Table 1-2 lists the optional units available for the EPL-5000/Action Laser 1000, and EPL-5200/Action Laser 1500.

Table 1-2. Options for EPL-5000/5200 and Action Laser 1000/1500

Cat. No.	Description	Note	Machine Type			
			EPL-5000	EPL-5200	Action Laser 1000	Action Laser 1500
5400 -54091	Bit map font card	For GQ mode (5400 Prestige 12N/L, 15N/L, 12 NOB are usable in ESC/P® mode)	Yes (Note 1),	Yes (Note 1)	Yes (Note 2)	Yes (Note 2)
1410-5414	HP bit map font card	For HP emulation mode	Yes	Yes	Yes	Yes
5430	OCR/BAR-CODE font card	For HP L/J and GQ mode (OCR-A/B fonts are also usable in ESC/P® mode)	Yes	Yes	Yes	Yes
C826031	22 scalable font card	For GQ mode	Yes (Note 1)	Yes (Note 1)	' °	' °
C82608*	51 scalable font card	For HP L/J III mode	Yes (Note 3)	'es	Yes (Note 3)	'es
C82609*	PostScript™ card	supports Postscript'" language	Yes (Note 4)	Yes (Note 4)	Yes (Note 4)	Yes (Note 4)
C82602*	EPSON GL Identity card	Supports HP-GL commands	Yes (Note 4)	Yes (Note 4)	Yes (Note 4)	Yes (Note 4]
C82322*	Epson PCL5/ RITech Upgrade Board	HP LaserJet® 111/I IIP/IIISi emulation mode (includes EPSON GL/2 mode) and RITech support	Yes	No	Yes	No
--	GQ chip ROM	Supports GQ mode fonts and commands	Yes (Note 5)	Yes (Note 5)	' °	' °
--	Local language ROM	supports local language fonts	Yes (Note 5)	Yes (Note 5)	' °	' °
C82904*	0.5MByte RAM chips	0.5MByte RAM chip set	Yes	Yes	Yes	Yes
C82905*	2. 0MByte RAM chips	2. 0MByte RAM chip set	Yes	Yes	Yes	Yes
C812302	250 sheet lower paper cassette (A4)	Lower paper cassette	Yes	Yes	No	No
C812301	250 sheet lower paper cassette (A/L)	Lower paper cassette	No	No	Yes	Yes
C81231•	Face-up tray		Yes	Yes	Yes	Yes
S051011	Imaging cartridge	Toner cartridge	Yes	Yes	Yes	Yes
C82305*/ C82306*	Serial interface card		No	No	Yes	No
>82307'/ C82308*	32KB serial interface card		Yes	Yes	Yes	Yes

Table 1-2. Options for EPL-5000/5200 and Action Laser 1000/1500 (Con't)

Cat. No.	Description	Note	Machine Type			
			EPL-5000	EPL-5200	Action Laser 1000	Action Laser 1500
C8231 0'/ C82311"	32KB parallel interface card		Yes	Yes	Yes	Yes
C82312*	LocalTalk™ card		Yes	Yes	Yes	Yes
C82313*	32KB IEEE-488 interface card		No	No	No	No
C82314*	COAX interface card		Yes	Yes	Yes	Yes
C82315*	TWINAX interface card		Yes	Yes	Yes	Yes

Notes:

1. **GQ mode** fonts can be used, if the optional GQ chip is installed.
2. The ActionLaser 1000/1500 uses only card 5400.
3. Scalable fonts for HP LaserJet III mode can used, if the optional Epson PCL5/RITech Upgrade Board is installed.
4. Requires added memory (RAM) over a total 1.5 MB (including standard RAM).
5. The GQ ROM chip option and local language ROM cannot be used at the same time.

1.2 SPECIFICATIONS

This section provides statistical data for the board. The fu and ActionLaser ard main a

the fc

Basic Specifications

Printing method:	Laser beam scanning and dry
Resolution:	300 A-hi (dots per inch)
Printing speed:	6 PPM (pages per minute)
First printing time)M (IC8)	Less than 19 seconds (facedown output) Less than 20 seconds (face-up output)
Warm-up time:	Less than 35 seconds (at rated current and 23° C (73° F) temperature)
Paper supply:	See Table 1-3.

Table 1-3. Paper Feed Methods

Paper Supply		)5A84 (IC3) 4	Paper Size	(Beam Weight)
Standard built-in paper bin	Auto feed	150	A4,LT,GLT,EXE, / IC	16 to 24 lb. C Socket (IC
		– to 10	/ / \ Commercial-10	Envelopes made of 20 to 24 lb. (75 to paper
	Manual feed	.	Any size (Note 2)	16 to 42 lb.
Lower paper cassette (Optional)		250	A4 or LT	16 to 24 lb. Connec

Notes:

1. lb. (ream weight) = 500 sheets of 17x 22 inch paper; 1 g/m^2 = 0.2659763 lb.
2. Paper size range: width 3.63to 8.5 inches
   length 5.85 to 14.0 inches (148.5 to 356 mm)

Paper types: See Table

Table 1-4. Paper Types

Standard paper	Xerox" 4024 U paper 20 lb.
Normal paper	Regular photocopier paper Bond paper 16 to 24 lb. (60 to 90
Special papers	Card (90 to 157 IN B Envelopes Letterhead Transparency sheets Colored

Usability ou special papers: See Table 1-5.

Table 1-5. Usability of Special Papers

input	output	OHP	Envelopes	Labels	Stock	Letterhead
Standard built-in paper bin	Face down	P	P			R
	Face up	R	R			R
Lower paper cassette	Face down	I				P
	Face up	I	I	I	I	P

R: Reliable feeding and good image quality.
P: Possible, but better avoided.
I: Impossible.

Paper feed alignment and direction: Center alignment for all sizes

Paper ejection: Face down; face up (optional)

Output tray capacity: 100 sheets (face down)
20 sheets (face up) (standard paper)

Printable area (standard paper): See Figure 1-2.

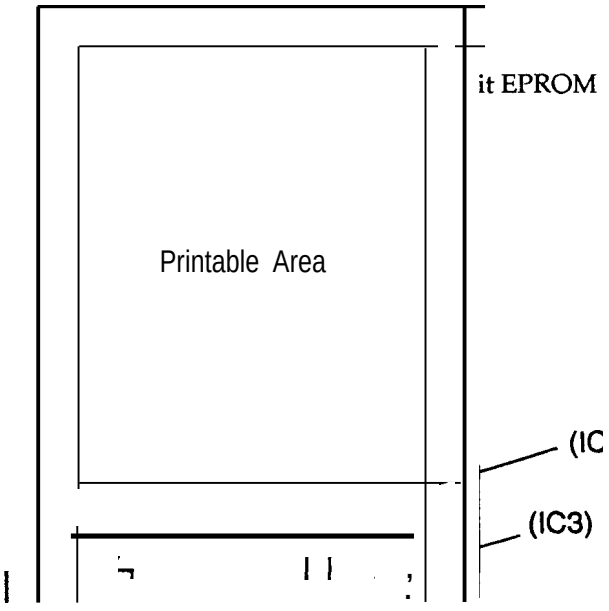


Figure 1-2. Printable Area

Note: ***The actual printable area depends on the printer mode.***

Noise: Less than 35 (standby)
Less than 47 (operating)

Ozone density: Less than 0.01 ppm

Toxicity: No toxicity exists in toner, or plastic materials

1.2.2 Electrical Specifications

Table 1-6. Electrical Specifications

Description	100 V Version	200 V Version
Rated voltage	100-120 VAC	220-240 VAC
Input voltage range	90-132 VAC	198-264 VAC
Rated frequency range	50-60 Hz	
Input frequency range	47-63 Hz	
Rated current	5.5 A	3.3 A
Power consumption	Less than 600 W	

1.2.3 Reliability Specifications

MPBF (Mean Prints Between Failures): Over 25,000 Sheets

Note: *MPBF indicates average number of pages printed before occurrence of problem requiring replacement or service.*

MTBF (Mean Time Between Failures):	3000 Power on hours (POH)
Jam rate:	1 out of 2,000 sheets or less (excluding multiple-sheet feeding)
Feed failure:	1 out of 2,000 sheets or less (excluding multiple-sheet feeding)
Multiple paper feeds:	1 out of 500 sheets or less
Paper curl height:	30 mm (1.2 inches) or less
Leading edge bending (1 cm or more):	1 out of 1,000 sheets
MTTR (Mean Time To Repair):	30 minutes or less
Durability:	5 years or 180,0000 sheets

1.2.4 Environmental Conditions for Operating (Include Imaging Cartridge)

Temperature:	10to35'C (50 to 95 'F)
Humidity:	15 to 85 %RH
Altitude:	2,500 m (8,200 feet) or lower
Levelness:	Printer should be installed on a level plane.
Illuminance:	3,000 IUX or less (Must not be exposed to direct sunlight.)
Surrounding space:	Printer should have at least 100 mm clearance on its sides and rear.

1.2.5 Environmental Conditions for Storage and Transportation (Exclude Imaging Cartridge)

Temperature:	Oto35'C (32 to 95 "F) over full storage term -20 to55"C (-4 to 131 "F) under extreme conditions (Extremes are allowable for up to 1/30 of full storage term) Temperature variation must be10'C (18 'F) /hour or less
Humidity:	30to85'%oRH over full storage term 10 to 95 %RH under extreme conditions (Extremes are allowable for up to 1/30 of full storage term)
Drop test:	Clear to JIS Z0200-1987 Level 1
Vibration:	Vibration frequency 5 to 100 Hz and 100 to 5 Hz Acceleration 1 G Acceleration direction 3direction
Resistance to atmospheric pressure:	More than 613 mb
Storage term:	24 months (following date of manufacture)

1.2.6 Applicable Standards

Safety Standards

120 VAC model:	UL 1950, CSA 22.2 Deviation 220
220/240 VAC model:	EN 60950 (IEC950), NEMKO (IEC950), SETI (IEC950), SEMKO (IEC950), DEMKO (IEC950)

Safety Regulations (Laser radiation)

120 VAC model:	FDA(NCDRH) Class 1
220/240 VAC model:	VDE O&37 (Laser Class 1)(IEC825), SETI (IEC825), SEMKO (IEC825), DEMKO (IEC825)

EMI

120 VAC model:	FCC Part 15 Subpart B Class B
220/240 VAC model:	FTZ (VDE 0871 Class B, 0875 Part 1), CISPR Pub22

Others

Toner:	No effect human health. (OSHA-TSCA, EINECS)
OPC:	No effect human health. (OSHA)
Ozone:	Less than 0.01 mmp other UL478 (5th edition)
Materials:	SWISS Environmental Law (No CdS must be contained)

1.2.7 Specification for Consumable (Imaging Cartridge)

Life:	6,000 pages

Note: *In continuous printing* ***mode with A4/letter*** *paper at a* 5% ***image ratio (black/white ratio). The life varies, depending on the printing mode (continuous or intermittent) and/or the image ratio.***

Environmental Conditions for Storage and Transportation

Temperature:	***Oto30"C(32*** to 86 'F) over full storage term -20 to40"C (-4 to 104 "F) under extreme condition (Extremes are allowable for up to 1/30 of full storage term) Temperature variations must be10"C (18 °F)/hour or less.
Humidity:	30 to 85 %RH over full storage term 10to95'%oRH under extreme conditions (Extremes are allowable for up to 1/30 of full storage term)
Drop test:	Height 76 cm (30.4 inches)
Vibration:	Same as printer
Resistance to atmospheric pressure:	More than 740 mb
Storage term:	18 months (following date of manufacture)

1.2.8 Physical Specifications

Dimensions:	
Printer:	368(W) x **456(D)** x 226(H) mm 14.5(W) x 18.0(D) x 8.9(H) inches
With lower cassette:	368(W) × **480(D) × 336(H) mm** **14.5(W)× 18.9(D) x 13.2(H) inches**
With face-up tray:	368(W) × **6 3 2 (D)** × 360(H) mm **14.5(W)× 24.9(D) x 14.2(H) inches**
With lower cassette and face-up tray:	368(W) × **657(D)** x 430(H) mm 14.5(W) x 25.9(D) x 16.9(H) inches
Weight:	Approx. 10 Kg (22 lb.) (consumable, excluding all options)
With lower cassette;	Approx. 12.8 Kg (28.3 lb.)
With face-up tray;	Approx. 10.1 Kg (22.3 lb.)
With lower cassette and face-up tray;	Approx. 12.9 Kg (28.6 lb.)

1.2.9 Software Specifications

Built-in modes:
HP LaserJet® 11P emulation: (EPL-5000/ActionLaser 1000)
HP LaserJet® III/IIIP/IIISi emulation mode: (EPL-5200/ActionLaser 1500)
Epson GL/2 mode (LJ3-GL/2 mode and GL-like mode):
(EPL-5200/ActionLaser 1500)
ESC/P® 9-pin (FX-86e/286e, FX-800/1000) emulation mode
ESC/P® 24-pin (LQ-2500) mode

Note: The Epson GL/2 mode is similar to the GL/2 mode included in the HP LaserJet® III/IIIP/IIISi emulation. Table 1-7 shows the differences between Epson GL/2 mode and the GL/2 mode in the HP LaserJet® III/IIIP/IIISi emulation. While in Epson GL/2 mode, the operator can enter GL/2 mode without sending the ESC%#B (Enter GL/2 mode) command. If the operator's application software cannot send the ESC %#B command, then use this mode.

Table 1-7. Differences between EPSON GL/2 and GL/2 in the HP LaserJet" III/IIIP/IIISi Emulation

	EPSON GL/2 Mode	GL/2 for HP LaserJet® III/IIIP/IIISi Emulation Mode
PCL mode	Does not exist	Exists as the initial mode
Paper eject	Supports PG, AF commands	Supported in PCL
Auto eject	SelecType setting	Not available
Reduced printing	SelecType setting	Available in PCL
Switch to PCL (ESC %#A)	Not supported	supported
Reset (ESC E)	Ejects paper and then initializes	Ejects paper, switches to PCL, and then initializes
PJL, EJL, and ES	Supported	supported
Advance Full Page (PG. AF)	Supported	Not supported

Notes: EPSON GL/2 mode has two operational modes. One is LJ3-GL/2 mode; the other is the GL-like mode.

LJ3-GL2 mode emulates the GL/2 mode in the HP LaserJet® III/IIIP/IIISi emulation. 'l'he user can print with software that supports the HP 7600 series plotter.

The GL-like mode features all the coremands of the LJ3-GL/2 mode, plus two additional commands. The GL-like mode emulates some of the HP-GL plotter (HP 7475A, etc.) commands. If the application software uses unsupported coremands for the GL-like mode, print cannot be assured.

Optional modes:
HP LaserJet® III/IIIP/IIISi emulation (EPL-5000/ActionLaser 1000)
EPSON GL/2 (EPL-5000/ActionLaser 1000)
Page Printer mode (GQ mode) (EPL-5000/5200)
Postscript™ mode (all models)
EPSON GL mode (all models)

Auxiliary software:
Hex dump
Status sheet
Font sampie

Built-in fonts: See Table 1-8 through Table 1-11.

Table 1-8. Built-in Fonts Laser 1000)

Resident Fonts						
fonts						
Courier	Medium	Upright	10	Portrait	s	s
Courier	Bold	Upright	10	Portrait	s	s
Courier	Medium	Italic	10	Portrait	s	NS
Courier	Medium	Upright	12	Portrait	s	s
Courier	Bold	Upright	12	Portrait	s	s
Courier	Medium	Italic	12	Portrait	s	NS
Line printer	Medium	Upright	16.66	Portrait	s	s
	Medium	Upright	12	Portrait	NS	s
	Medium		20	Portrait		s

i: Supported, Not Supported

Table 1-9. Built-in Fonts Laser 1500 and Laser 1000 with FUSING Board)

Resident Fonts					Applicable Mode	
					HP LJ3	
Bitmap fonts						
Courier	Medium	Upright	10	Portrait	S	S
Courier	Bold	Upright	10	Portrait	S	S
Courier	Medium	Italic	10	Portrait	S	NS
Courier	Medium	Upright	10	Landscape	S	S
Courier	Bold	Upright	10	Landscape	S	S
Courier	Medium	Italic	10	Landscape	S	NS
Courier	Medium	Upright	12	Portrait	S	S
Courier	Bold	Upright	12	Portrait	S	S
Courier	Medium	Italic	12	Portrait	S	NS
Courier	Medium	Upright	12	Landscape	S	S
Courier	Bold	Upright	12	Landscape	S	S
Courier	Medium	Italic	12	Landscape	S	NS
Line printer	Medium	Upright	16.66	Portrait	S	S
Line printer	Medium	Upright	16.66	Landscape	S	S
	Medium	Upright	12	Portrait	NS	S
	Medium	Upright	20	Portrait	NS	S
Scalable *fonts for* CAR						
EPSON Roman T	Medium	Upright			S	NS
EPSON Roman T	Bold	Upright			S	NS
EPSON Roman T	Medium	Italic			S	NS
EPSON Roman T	Bold	Italic			S	NS
EPSON Saris Serif U	Medium	Upright			S	NS
EPSON Saris Serif U	Bold	Upright			S	NS
EPSON Saris Serif U	Medium	Italic			S	NS
EPSON Saris Serif U	Bold	Italic			S	NS
EPSON Saris Serif U	Medium	Condensed	Upright		S	NS
EPSON Saris Serif U	Bold	Condensed	Upright		S	NS
EPSON Saris Serif U	Medium	Condensed	Italic		S	NS
EPSON Saris Serif U	Bold	Condensed	Italic		S	NS
ITC	Medium	Upright			S	NS

S: Supported, Not Supported

Table 1-10. Built-in Fonts (EPL-5000 with GQ Chip)

Resident Fonts					Applicable Mode		
					HP		GQ
Bitmap fonts							
Courier	Medium	Upright	10 cpi	Portrait	S	S	S
Courier Bold	Bold	Upright	10 cpi	Portrait	S	S	S
Courier Italic	Medium	Italic	10 cpi	Portrait	S	NS	NS
Courier	Medium	Upright	10 cpi		NS	S	S
Courier Bold	Bold	Upright	10 cpi		NS	S	S
Courier	Medium	Upright	12 cpi	Portrait	S	S	NS
Courier Bold	Bold	Upright	12 cpi	Portrait	S	S	NS
Courier Italic	Medium	Italic	12 cpi	Portrait	S	NS	NS
Line printer	Medium	Upright	16.66 cpi	Portrait	S	S	S
Line printer	Medium	Upright	16.66 cpi		NS	S	S
Presitage	Medium	Upright	12	Portrait	NS	S	S
Presitage	Medium	Upright	20	Portrait	NS	S	S
EDP	Medium	Upright	13	Portrait	NS	NS	S
EDP	Medium	Upright			NS	NS	S
Modern	Medium	Upright	10 point	Portrait	NS	NS	S
FONT *fonts* E	*G(?*						
Courier	Medium	Upright			NS	NS	S
Courier	Bold	Upright			NS	NS	S
Courier	Medium	Oblique			NS	NS	S
Courier	Bold	Oblique			NS	NS	S
EPSON Roman T	Medium	Upright			NS	NS	S
EPSON Roman T	Bold	Upright			NS	NS	S
EPSON Roman T	Medium	n M			NS	NS	S
EPSON Roman T	Bold				NS	NS	S
EPSON Saris serif H	Medium	Upright			NS	NS	S
EPSON Saris serif H	Bold	Upright			NS	NS	S
EPSON Saris serif H	Medium	Oblique			NS	NS	S
EPSON Saris H	Bold				NS	NS	S
EPSON Set	Medium				NS	NS	S

S: Supported, NS: Not **Supported**

Table 1-11. Built-in Fonts (EPL-5200 with GQ Chip Option and EPL-5000 with PCL5® Board and GQ Chip)

Resident Fonts					Applicable Mode		
					HP LJ3	ESC/P®	GQ
Bitmap fonts							
Courier	Medium	Upright	10 cpi	Portrait	S	S	S
Courier	Bold	Upright	10 cpi	Portrait	S	S	S
Courier	Medium	Italic	10 cpi	Portrait	S	NS	NS
Courier	Medium	Upright	10 cpi	Landscape	S	S	S
Courier	Bold	Upright	10 cpi	Landscape	S	S	S
Courier	Medium	Italic	10 cpi	Landscape	S	NS	NS
Courier	Medium	Upright	12 cpi	Portrait	S	S	NS
Courier	Bold	Upright	12 cpi	Portrait	S	S	NS
Courier	Medium	Italic	12 cpi	Portrait	S	NS	NS
Courier	Medium	Upright	12 cpi	Landscape	S	S	NS
Courier	Bold	Upright	12 cpi	Landscape	S	S	NS
Courier	Medium	Italic	12 cpi	Landscape	S	NS	NS
Line printer	Medium	Upright	16.66 cpi	Portrait	S	S	S
Line printer	Medium	Upright	16.66 cpi	Landscape	S	S	S
Presitage	Medium	Upright	12 cpi	Portrait	NS	S	S
Presitage	Medium	Upright	20 cpi	Portrait	NS	S	S
EDP	Medium	Upright	13 cpi	Portrait	NS	NS	S
EDP	Medium	Upright	13 cpi	Landscape	NS	NS	S
Modern	Medium	Upright	10 point	Portrait	NS	NS	S
Scalable font for PCL5®							
EPSON Roman T	Medium	Upright			S	NS	NS
EPSON Roman T	Bold	Upright			S	NS	NS
EPSON Roman T	Medium	Italic			S	NS	NS
EPSON Roman T	Bold	Italic			S	NS	NS
EPSON Saris serif U	Medium	Upright			S	NS	NS
EPSON Saris serif U	Bold	Upright			S	NS	NS
EPSON Saris serif U	*Medium*	Italic			S	NS	NS
EPSON Saris serif U	Bold	Italic			S	NS	NS
EPSON Saris serif U	Medium	Condensed Upright			S	NS	NS
EPSON Saris serif U	Bold	Condensed Upright			S	NS	NS
EPSON Saris serif U	Medium	Condensed Italic			S	NS	NS
EPSON Saris serif U	Bold	Condensed Italic			S	NS	NS
ITC ZapfDingbatts®	Medium	Upright			S	NS	NS
Scalable fonts for GQ							
Courier	Medium	Upright			NS	NS	S
Courier	Bold	Upright			NS	NS	S
Courier	Medium	Oblique			NS	NS	S
Courier	Bold	Oblique			NS	NS	S
EPSON Roman T	Medium	Upright			NS	NS	S
EPSON Roman T	Bold	Upright			NS	NS	S
EPSON Roman T	Medium	Italic			NS	NS	S
EPSON Roman T	Bold	Italic			NS	NS	S
EPSON Saris serif H	Medium	Upright			NS	NS	S
EPSON Saris serif H	Bold	Upright			NS	NS	S
EPSON Saris serif H	Medium	Oblique			NS	NS	S
EPSON Saris serif H	Bold	Oblique			NS	NS	S
EPSON Symbolic Set	Medium	Upright			NS	NS	S

S: Supported, NS: Not Supported

Font Symbol Sets

HP LaserJet® 11P Mode: 26 symbol sets

1S02, 4,6,10,11,14,15,16,17, 21,25,57,60,61,69,84, 85

ISO1OO(ECMA94-1)	Roman Extension
HP German	HP Spanish
HP Legal	HP Roman-8
IBM-US	IBM-DN
PcMultilingual	

HP LaserJet® III/IIIP/IIISi Mode: 41 symbol sets

1S02, 4,6,10,11,14,15,16,17, 21,25,57,60,61,69,84, 85

ISO1OO(ECMA94-1)	
Roman Extension	Venture Math
HP German	Venture International
HP Spanish	Venture US
HP legal	PS Math
HP Roman-8	PS Text
IBM-US	Math 8
IBM-DN	Pi Font
PcMultilingual	Microsoft Publishing
Venture ITC Zapf Dingbatts	Windows
PS ITC Zapf Dingbatts	DeskTop
ITC Zapf Dingbatts® 100	
ITC Zapf **Dingbatts® 200**	
ITC Zapf Dingbatts® 300	

ESC/P Mode: 13 **International Characters**

USA	SPAIN1
FRANCE	JAPAN
GERMANY	NORWAY
UK	DENMARK2
DENMARK1	SPAIN2
SWEDENT	L.AMERICA
ITALY	

(In addition to the above, Code Page 860,863,850,865 and 437 can also be selected by SelecType.)

GQ Mode: **35** symbol sets (Option)

USA	*	SPAIN1	*
FRANCE	*	JAPAN	*
GERMANY	*	NORWAY	*
UK	*	DENMARK2	*
DENMARK1	*	SPAIN2	*
SWEDEN	*	L. AMERICA	*
ITALY	*		

● : Two types, one **with extended graphics and one without.**

Code page 865 (PcNordic)	Code page 860 (PcPortuguese)
Code page 850 (PcMultilingual)	ECMA94-1
Code Page 437 (PcUSA)	Symbolic
Code Page 863 (PcCanFrench)	Code Page 853
Code Page 857	

1.3 INTERFACE SPECIFICATIONS

The EPL-5000/5200 and ActionLaser 1500 are equipped with the following external interfaces:

- ■ Centronics® parallel interface
- ❑ RS-232C interface
- ■ Optional Type B interface (except for C82305*/C82306*)

The ActionLaser 1000 is equipped with the following external interfaces:

- ❑ Centronics® parallel interface
- ■ Optional Type B host interface (including C82305*/C82306*)

1.3.1 Parallel Interface

Type: Centronics®
System: STROBE synchronization, 8-bit parallel data transfer
Handshaking: BUSY and ACKNOWLEDGE signals

Note: While the SelecType setting for BUSY delay is "MIN," the handshaking signal is BUSY only.

Comector type: P90-25027-1 (Amphenol) receptacle
Applicable plug: 57-30360 (Amphenol or equivalent)
Transfer speed: About ***75,000*** bytes/second (max.) (EPL-5000/ActionLaser 1000)
About 125,000 bytes/second (max.) (EPL-5200/ActionLaser 1500)
Signal timing: See Figure 1-3.
Signal description: See Table 1-12.

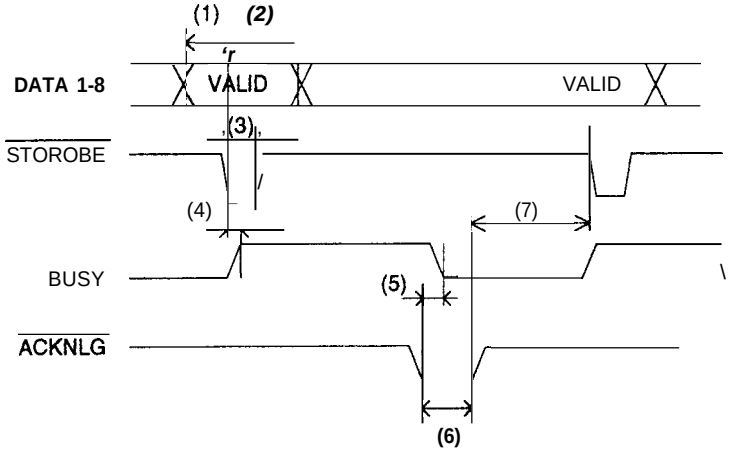


Figure 1-3. Signal Timing

Table 1-12. Signal Timing

No.	Description	Time (μsec.)
(1)	Data set up	0.5 (min.)
(2)	DATA hold	0.5 (min.)
(3)	$\overline{\text{STROBE}}$ (pulse width)	0.5 (min.)
(4)	BUSY delay	4.0 (max.)
(5)	$\overline{\text{ACKNLG}}$ to BUSY –5	o (typ.)
	o	5 (typ.)
	+5	10 (typ.)
	No $\overline{\text{ACKNLG}}$ pulse	—
(6)	$\overline{\text{ACKNLG}}$ pulse width	10 (typ.)
(7)	$\overline{\text{ACKNLG}}$ to $\overline{\text{STROBE}}$	O (min.)

Table 1-13. Centronics® Parallel Interface Pin Assignment

Pin No.	Signal Name	I/O	Description
1	$\overline{\text{STROBE}}$	IN	$\overline{\text{STROBE}}$ is a strobe pulse used to read data from the host computer. The pulse width must be more than 0.5 µsec. Normally it is HIGH, and data is latched at the trailing edge of this signal.
2-9	DATA 1-8	IN	DATA 1 to 8 are parallel data bits. When the signal is HIGH, the data bit is 1, and when it is LOW, the data bit is O. The most significant bit (MSB) is DATA8. The signal state must be maintained for 0.5 µsec. on either side of the $\overline{\text{STROBE}}$ signal active edge.
10	$\overline{\text{ACKNLG}}$	OUT	$\overline{\text{ACKNLG}}$ is an acknowledge pulse with an approximate width of 10 @cc. This signal goes LOW when the data reception is completed, which indicates that the printer can accept new data. Timing with the BUSY signal is specified through SelecType.
11	BUSY	OUT	The BUSY signal informs the host computer of the printer state. When the signal is HIGH, the printer cannot accept data.
12	PE	OUT	The PE signal indicates paper empty for the standard cassette selected through SelecType or command, or for the option paper cassette. Paper empty is indicated by HIGH.
13	SLCT	OUT	Pulled up to +5V through a 3.3 Kohm resistor.
14	$\overline{\text{AUTO-FEED}}$	IN	If the $\overline{\text{AUTO FEED}}$ signal is set to LOW, the printer automagically performs a LF (line feed) upon receiving a CR (Carriage Return) oode from the host computer. In GQ Mode (option) or ESC/P® Mode, $\overline{\text{AUTO-FEED}}$ signal affects the CR operation according to SelecType settings. In HP Mode, AUTO-FEED signal is always ignored. Detection can only be done when the printer is ON or when active interface is switched to parallel interface. This signal is detected only when the power is turned ON, or when the printer is initialized.
15	NC	·	Not used.
16	GND		Logic ground level.
17	CHASSIS GND	-	Connected to the printer chassis. The printer chassis GND and the signal GND are connected to each other.
18	NC		Not used.
19-30	GND		Ground level for the twisted pair return signal.
31	$\overline{\text{INIT}}$	IN	The STROBE signal is ignored when this signal is LOW.
32	$\overline{\text{ERROR}}$	OUT	This level goes LOW when the printer is: • out of paper • paper jam • in error state • off line
33	GND		Same as for pins19 to 30.
34	NC		Not used.
35	+5V		Pulled up to +5V through 3.3 Kohm resistance.

Table 1-13. f Messages Interface Pin Assignment (Continued)

ow No.	Signal Name		Description
36	Me	IN	If the signal is LOW when the printer is turned on or initialized, the printer enters the state. In this state, ie pi and stat control codes are ignored. If the signal is HIGH when the printer is turned on or initialized, the select/deselect control by ges is valid. If the printer receives a code, any subsequent data be thrown out until a code is received. Handshaking with the BUSY or ACKNLG however, is for data during this time. It is possible to disable signal with and keep the printer constantly in the selected state. In GQ mode (option) or mode, this affects the or)ata operation according to the printer settings. In HP Mode this signal always ignored.

1.3.2 Serial Interface (Except for the ActionLaser 1000)

Type: RS-232C

Transfer system: duplex

Synchronization: Asynchronous start-stop system
- Start-bit: 1
- Stop-bit: 1 or 2
- Data length: 7 bits or 8 bits
- Parity: Odd, even, or none

Protocol: X-ON/X-OFF (can be combined with chin control)
)AW control (can be combined with X-ON/X-OFF)

Transfer speed: 300,600,1200,2400,4800, 9600,19200, or 38400 bps

Error:
- Overrun error: Processed as missing data and replaced by "*"
- Parity *error:* Replaced by "*"
- Framing error: Replaced by "*"
- Breaking character: Ignored

Signal description: See Table 1-14.

Table 1-14. Serial Interface Connector Pin Assignments

of c	Signal Name	di	Description
1	o reset the toner counte ress the CONTINUE but		Connected to the printer chassis. The printer chassis and the signal open are connected to each other.
2			Serial ASCII data outputted by the printer. It maintains "MARK" state (LOW between transmitted character codes. Logic O is at HIGH level ("SPACE") and logic 1 is at LOW level ("MARK").
3			data inputted to the printer. it maintains "MARK" state (LOW level) between received character codes.
4		OUT	Transmission request signal outputted from the printer. It is always at HiGH level during power ON.
5		IN	Response signal to the signal inputted to the printer. The printer transmits the data through TXD while is HIGH. can be fixed HIGH through When the setting for is ON, X-ON/X-OFF will not be transmitted if is LOW.

Table 1-14. Serial Interface Connector Pin Assignments (Continued)

Pin No	Signal Name	I/O	Description
6	DSR	IN	Signal inputted to the printer. The printer can transmit data through TXD while DSR is HIGH. X-ON/X-OFF, however, can be transmitted regardless of DSR state. It can always be ignored by setting SelecType (Factory setting).
7	SIGNAL GND		Ground reference (O V) for signals.
8	DCD	IN	Always ignored.
9-19	NC		Not used.
20	DTR	OUT	Signal outputted by the printer. When the DTR signal is HIGH, it indicates that the RXD signal can be received by the printer. The SelecType settings do not specify DTR control, the signal level is HIGH while the printer power is on. When SelecType setting is used for DTR control, DTR goes LOW in case any of the error conditions. The date (RXD) from host computer must be stopped within 128 characters after DTR goes LOW.
21-25	NC		Not used.

Handshaking

When the vacant area for data in the input buffer drops to 128 bytes, the printer outputs an X-OFF code or sets the DTR signal level to LOW, indicating that the printer cannot receive more data. Once the vacant area for data in the buffer recovers to 256 bytes, the printer outputs an X-ON code or sets the DTR flag to HIGH, indicating that printer is again ready to receive data.

Protocol

There are three types of protocols, as listed below, and each of them can be designated by SelecType independently.

■ DTR/DSR protocol

SelecType is used to execute the DTR/DSR control protocol. The DTR signal is set to HIGH when the printer is ready to receive data, and to LOW when conditions indicate an error or that the receiving buffer is full.

When the error is cleared and the printer returns to on line mode, the signal returns to HIGH. When SelecType is used to set the DTR control OFF, DTR is always set HIGH. The printer transmits TXD only when DSR is at the HIGH level (DSR is always considered HIGH when the SelecType setting for DSR is OFF). X-ON/X-OFF transmission is independent from the DSR state.

■ X-ON/X-OFF (DC1/DC3) protocol

SelecType is used to execute X-ON/X-OFF protocol. The X-OFF (DC3) code is output if status indicates an error, and the printer warns the host to stop data transmission within 128 characters. No further X-OFF codes are sent in response to additional data received from the host after the X-OFF code has been sent once. The X-ON (DC1) code is output after all conditions given in error are cleared.

When the remaining capacity of the receive buffer reaches 128 characters, X-OFF (DC3) is output once. It is sent only once, even if there are multiple errors. The printer goes on line automatically at power on, and outputs an X-ON code. Transmission of X-ON/X-OFF codes can be defined by SelecType.

■ ENQ/ACK Protocol

If the EPSON GL mode (optional) is selected, ENQ/ACK protocol is also supported.

1.3.3 Optional Interface C82305*/C82306* (ActionLaser 1000 Only)

The ActionLaser 1000 can use the non-intelligent serial interface card C82305*/C82306*.

Type:	RS-232C or current loop	
Synchronization:	Asynchronous start-stop system	
	Start bit:	1
	Stop bit:	1
	Data length:	7 bits or 8 bits
	Parity:	Odd, even, or none
Protocol:	X-ON/X-OFF (cannot be combined with DTR control) DTR control (cannot be combined with X-ON/X-OFF)	
Transfer speed:	300,600,1200,2400,4800, 9600, or 19200 bps	
Error:	Overrun error:	Processed as missing data and replaced by "*"
	Parity error:	Replaced by "*"
	Framing error:	Replaced by "*"
	Breaking character: Ignored	

1.4 OPERATING INSTRUCTIONS

This section describes **the functions performed** through the control panel, such as test print, hexadecimal dump, and functions.

1.4.1 Control Panel

The printer control panel gives you easy control over most common printer operations. The panel consists of a liquid crystal display (LCD), indicator lights, and buttons.

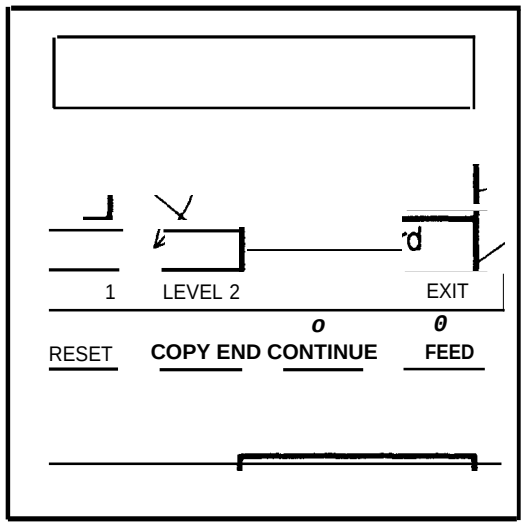


Figure 1-4. Control Panel

Display (LCD)

A 20-character (5 x 7 dot matrix) l-row crystal display (LCD) unit that indicates printer status. A of printer can be displayed and mode.

Indicator lights

■ **ON** LINE

ON: Communication with the host is possible.

OFF: Communication with the host is impossible.

Flashing: This state occurs when the system cannot shift from off line to on line, or vice versa.

■ FEED

This LED indicates the data processing condition for each interface channel: S, P, and O.

ON: Indicates that received data is stored in the printer that has not been printed out. However, the LED does not light up when only non-printable data ds and other control codes) is stored.

OFF: Indicates there is ***no*** printable data remaining in the printer.

Fast flashing: Indicates that the printer is in the process of receiving data from the host.

Slow flashing: Indicates data has arrived on a non-active channel (in auto-sense operation).

CONTINUE

Flashes when an error is detected or a maintenance procedure is needed. An error message appears on the display at the same time.

Buttons

■ ON LINE/EXIT

ON LINE: This button switches the printer between on line and off line mode. This button is invalid in SelecType mode, but is effective in the hex dump mode.

EXIT: Exits SelecType mode.

■ SelecType

LEVEL 1: Enters SelecType Level 1.

LEVEL 2: Enters SelecType Level 2.

[f printer power is turned on while this button is pressed, the printer enters hex dump mode. (AH charnels are switched to hex dump mode.) This button is invalid once the printer enters the hex dump mode.

■ RESET/INITIALIZE

RESET: Holding down this button until RESET appears on the display causes the printer to finish printing the current page and then stop. The remaining data is discarded, and some SelecType Level 1 settings return to their previously saved value.

INITIALIZE: Continuing to hold this button down after RESET appears causes the message to change to INITIALIZE. This function clears received print data and returns SelecType Level 1 and 2 settings to their power-on settings.

Holding down this button while turning on the printer, causes FACTORY RESET to appear on the display, and all SelecType settings return to the factory settings.

■ COPY END/
CH (P, S, or O) (EPL-5000/5200, ActionLaser 1500)
CH (P or O) (ActionLaser 1000)

COPY END: Cancels the remaining copies when multicopy printing is selected and the printer is off line.

CH (P, S, or O), CH (P or O): If the printer is set to auto-sense mode or individual mode, you can change the interface charnel with this button.

❑ CONTINUE/IES (PS&xx)

CONTINUE: Pressing this button when the CONTINUE LED is flashing clears an error.

IES (PS&xx): In IES mode, you can change the initial mode (PostScript or other mode).

■ FEED

When the printer is off line and the FEED light is lit, press this button to print out data in the printer's memory.

1.4.2 SelecType Functions

This printer has two levels of SelecType, Level 1 and Level 2. Either level can be selected by pressing the Level 1 or Level 2 button. SelecType Level 1 is called Mode Configuration. SelecType Level 2 is called Printer Configuration.

The following menu maps show the possible menus options in SelecType.

Key: ( ) - Only available with option.
[ ] - Only available with LJ-3/P/Si mode.

SelecType Level 1

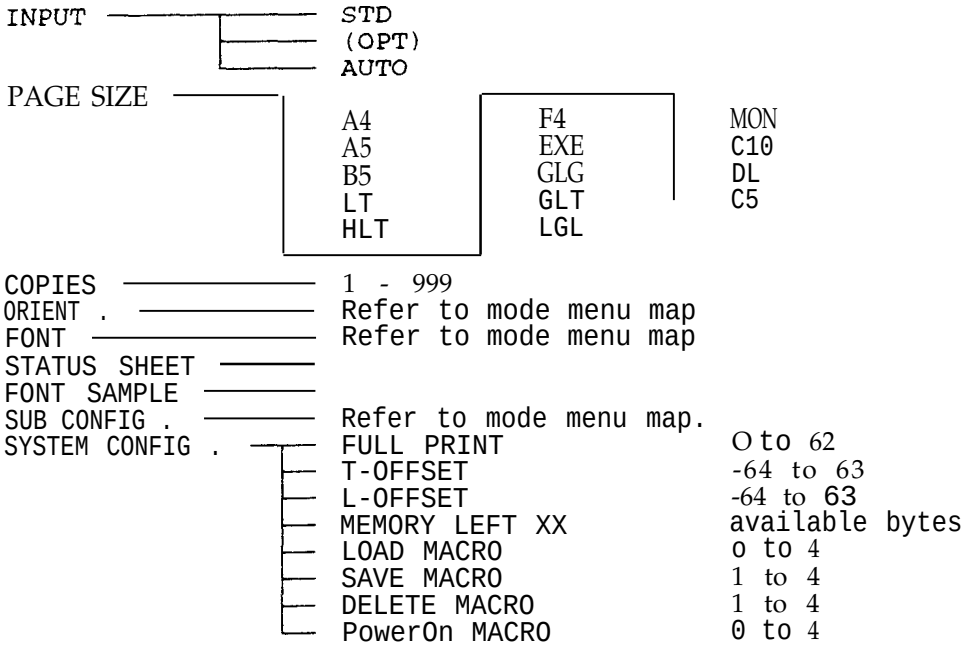


Figure 1-5. SelecType Level 1 Menu Map

SelecType Level 1 in LJ-2P and 3/P/Si Mode

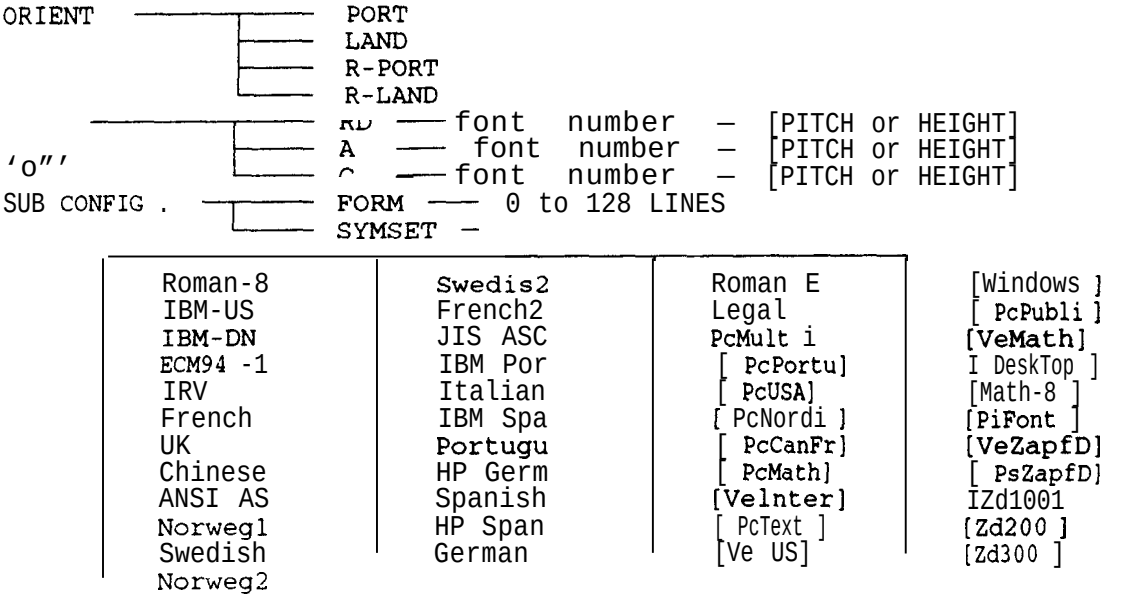


Figure 1-6. SelecType Level 1 in LJ-2P & 3/P/Si Menu Map

SelecType Level 1 in Epson GL/2 Mode

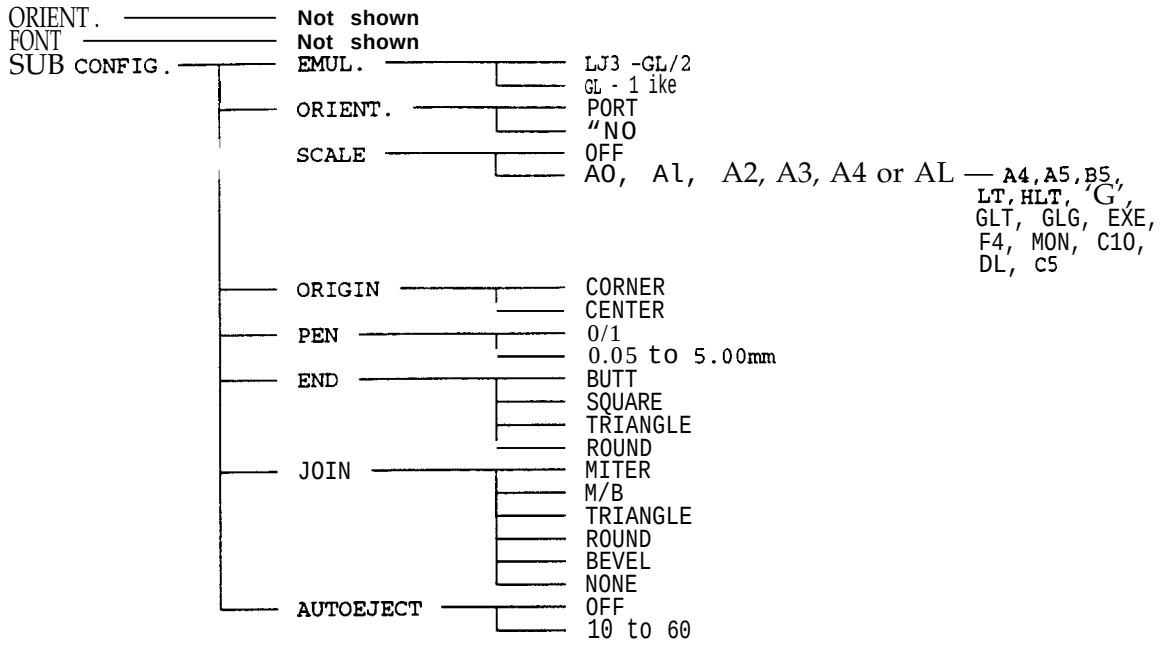


Figure 1-7. SelecType Level 1 in EpsonGL/2Mode Menu Map

SelecType Level 1 in LQ and FX Mode

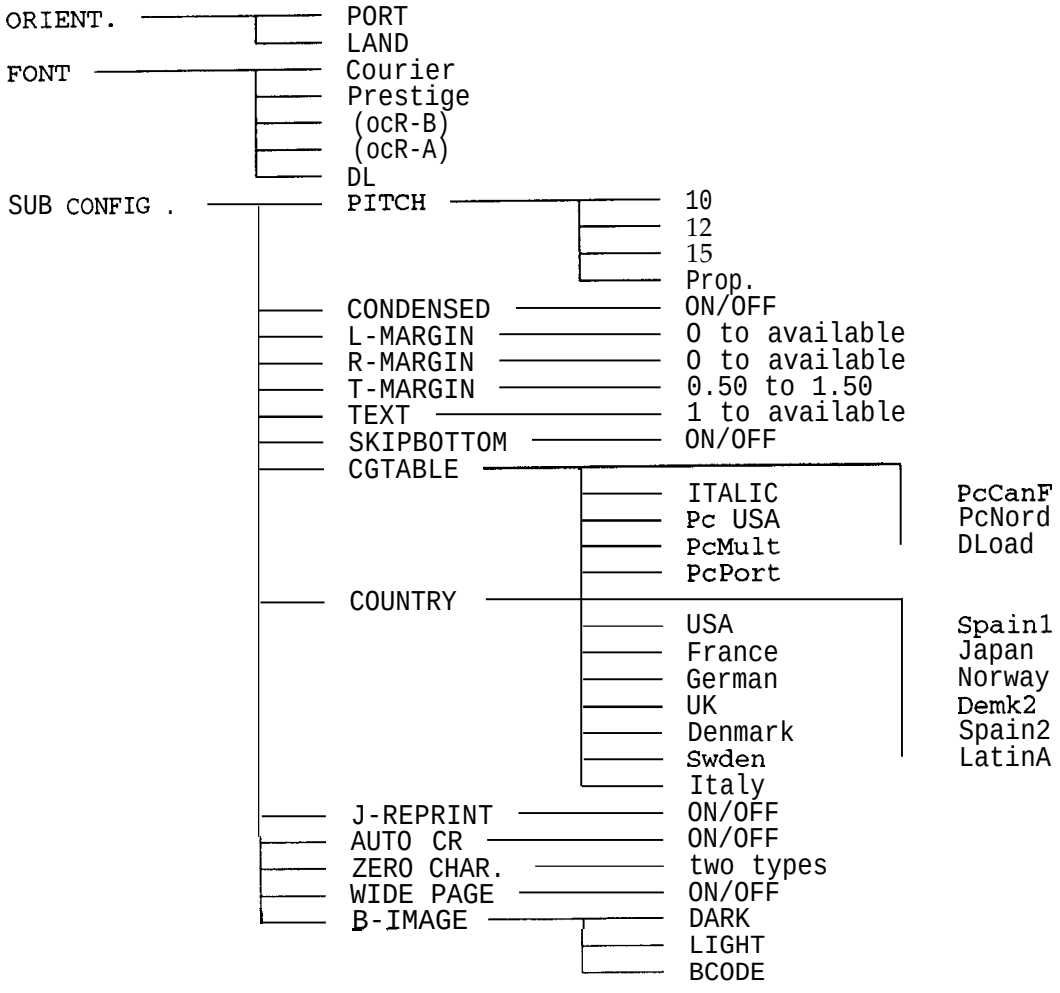


Figure I-8. SelecType Level 1 in LQandFXMode Menu Map

SelecType Level 2

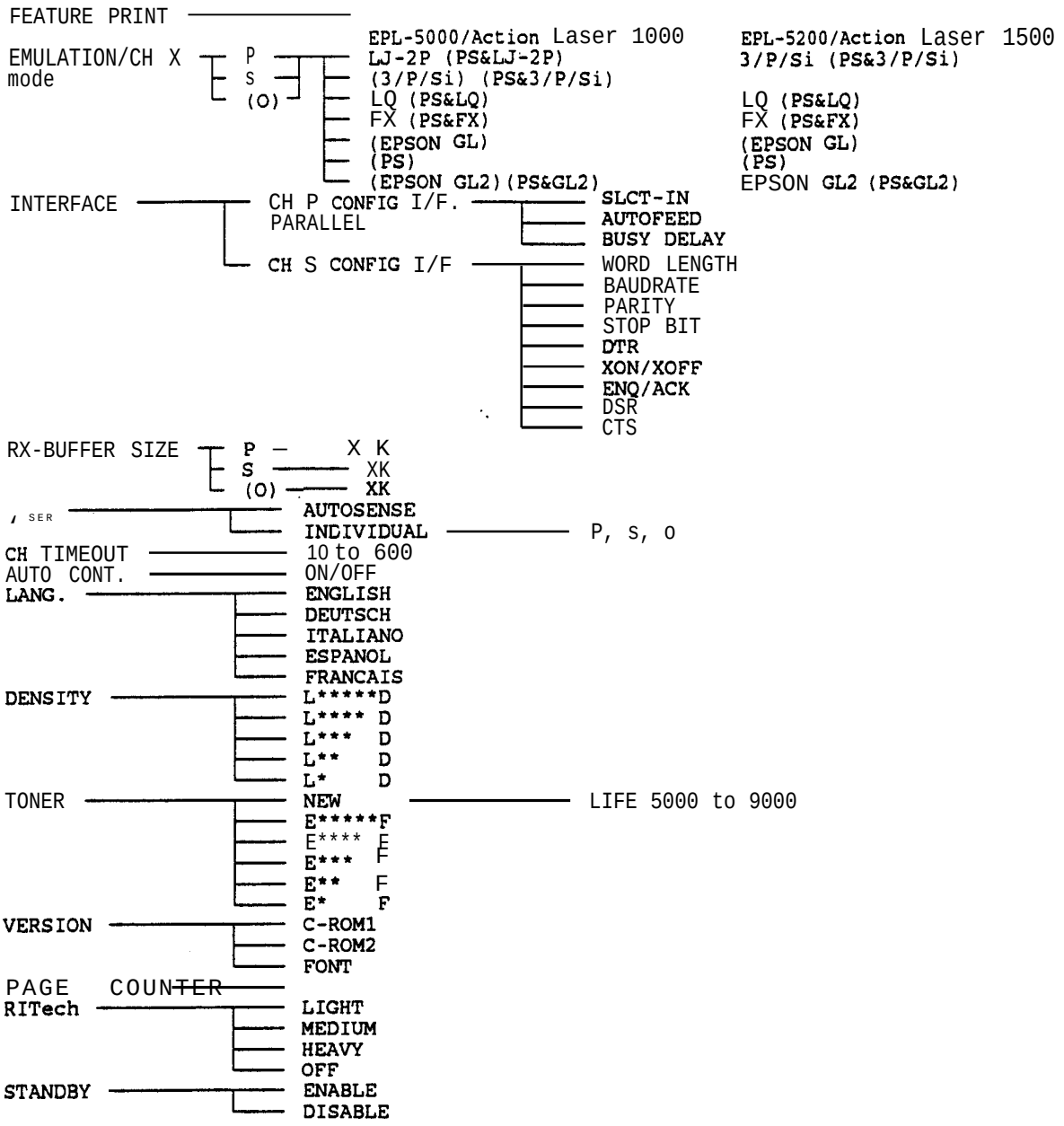


Figure 1-9. SelecType Level 2

Note: The Action Laser 1000 does not indicate CH S (serial interface). The standard EPL-5000/Action Laser 1000 does not have R/Tech.

1.4.3 Display of Messages

This printer displays three types of messages on the LCD: status messages, error messages, and power on messages.

1.4.3.1 Status Messages

The LCD panel normally indicates the printer's status and the software mode.

Table 1-15. Status Messages

Message	Status
READY ● 1	Normal condition
WARMING UP *3	Warming up
DATA *1	Data has been received while the printer is off line
PRINTING *2	Printing
PAPER FEEDING *2	Paper feeding
PRINT PAUSED *2	Print paused
COPY END ● 2	The COPY END button has been pressed
STANDBY *1	Standby mode
RESET ● 1	Resetting
INITIALIZE	Initializing
FONT CREATING	Creating fonts (image creation)
CHAR CREATING	Creating characters by caching
GRAPHIC DRAWING	Drawing a graphic image
OFF LINE ● 4	Off line with no data in the buffer
NEW CARTRIDGE? YES, RESET NO, CONTINUE *4	This message displays for 10 seconds at power on when toner is out (the TONER display is "E* F"). To reset the toner counter, press the RESET button. The toner counter does not change when you hold down the CONTINUE button for over 10 seconds.

*1: The right side of the LCD panel indicates the charnel and software mode.

*2: When the multicopy print mode is selected, the number of copies printed (X) and the number of copies specified (Y) are displayed (X/Y).

*3: The right side of the LCD panel indicates the TONER LEFT.

4: This message displays also, when the cover is open and toner is out (the TONER display is "E F"). To reset the toner counter, press the RESET button. The toner counter will not change if you press the CONTINUE button or close the cover.

1.4.3.2 Error Messages

If any of the following errors occurs, it will be displayed on the LCD panel. The error must be cleared immediately using the measures shown in the following table.

Table 1-16. Error Messages

Message	Status	Measures
SAVE MEMORY OVERFLOW	EEPROM capacity is insufficient to accommodate SAVE MACRO.	Delete unnecessary MACRO and ther repeat SAVE. ● 3
RESIDENT CARD	The IC card was removed while the FEED light was M. ● 1	Reinsert the IC card and press the CONTINUE button.
ILLEGAL CARD #X	The IC card in slot #X is not accessible. ● 1	Remove the IC card and press the CONTINUE button.
REMOVE CARD	An IC card was inserted in on line mode or while the FEED light was M. ● 1	Remove IC card and press the CONTINUE button. ● 3
CARD MEMORY OVERFLOW	The total capacity of the card in slot A exceeds 4MB.	Remove the IC card and press the CONTINUE button.
SET FULL PRINT	Full print mode is recommended. ● 1 *2	Confirm and press the CONTINUE button. ● 3
PAGE BUFFER FULL	Text data has filled thebuffer, and the page is ejected. ● 1 ● 2	Confirm and press the CONTINUE button. And add optional RAM chips. *3
ADD MEMORY FOR CH X	A memory shortage caused by: 1) Printer mode change. 2) RX-BUFFER SIZE increase. 3) CH INDIVIDUAL setting change. X indicates the channel where the memory shortage was detected.	Add memory. Press the LEVEL 2 button to enter SelecType Level 2, and adjust the INDIVIDUAL memory distribution, or reduce RX-BUFFER SIZE.
INVALID ASSIGN	PostScript™ mode is set to lwo channels.	Set PostScript™ mode to one channel.
INSUFF. MEMORY	Register-type data filled the memory, and the registration failed. ● 1 *2	Confirm and press the CONTINUE button or power off. Add optional RAM chips. ● 3
PAPER SIZE ERROR	The printer's paper size was different from the selected paper size. ● 1 ● 2	Confirm and press the CONTINUE button. ● 3
TRAY SET xxx paper size) xx is OPT, STD, or AUTO	The paper in the selected tray is different from the paper size chosen by software command. The LCD displays paper size and tray. ● 1 ● 2	Load proper paper and press the CONTINUE button, or simply press the CONTINUE button.
PAPER OUT	No paper is left in either the standard cassette or the optional cassette.	PRESS ON LINE is dispfayed, when paper is loaded in the standard or optional tray. After this displays, press the ON LINE button.
PAPER OUT XXX paper size) xx is OPT, STD, or AUTO	No paper is available in the specified cassette. Indicates the paper size and the cassette to be loaded.	Load paper into the cassette.
COVER OPEN [XXX)(XX XXXXX is toner left)	Cover is open.	Close the cover.

Table 1-16. Error Messages (Continued)

Message	Status	Measures
RESELECT TRAY	The optional lower cassette has been selected, but it's not connected. *1	Connect the optional lower cassette, and press the CONTINUE button. Or press the CONTINUE button. *3
FEED JAM	A paper jam has occurred in the feed process. *1	Remove the jammed paper. Afterward, press the CONTINUE button. (System recovery is always performed automatically.)
PAPER JAM	A paper jam has occurred.	Open the cover and remove the jammed paper. Afterward, close the cover.
SPL IGNORED	The mode was not changed by EJL or PJL. *1 *2	Confirm and press the CONTINUE button.
SERVICE REQ. XXXXX	Printer problem.	Service required.

*1: The CONTINUE light flashes.
*2: AUTO CONTINUE is possible.
*3: Pressing the RESET button also is possible.

Note: ***"WARMING UP" is displayed to give the printer time to clean the OPC after error recovery measures are taken.***

1.4.3.3 Power On Display

The control panel will display the messages in the table below only at power on.

Table 1-17. Display at Power On

Order	Control Panel Display and Operation	Error Operation
1	All lights light up for approximately 1.5 seconds.	—
2	The system checks the EPROM and MASK ROM. The message "ROM CHECK" is displayed on the LCD panel.	The message "SERVICE REQ. Cxxxx" will be displayed if an error is detected during the cheek.
3	The system cheeks RAM. The message "RAM CHECK X.X MB" is displayed on the LCD panel, and the capacity of RAM that has passed the check is displayed as "X. XMB". All lights go off. This message remains on the LCD for several seconds after the check has been completed. Then a normal message, such as "WARMING UP," will be displayed.	The message "RAM ERROR" will be displayed if an error is detected.
4	The system checks the EEPROM.	If an EEPROM error occurs, "START UP ERROR LT <> A4° will be displayed after the RAM check. When the ">" or "<" button is pressed, the EEPROM is reset to the factory setting. The message "WAIT" is displayed during the resetting operation.

1.4.4 Printer Sharing

This printer has two methods of printer sharing. This section describes printer sharing and the data receive buffer.

1.4.4.1 Individual Mode

It is possible, depending on the RAM partition method, to allocate the various modes to either CH P, CH S, or CH O. The partitioned RAM segments do not interfere with each other, so the user of each **channel can share the printer as if there were actually three individual printers.**

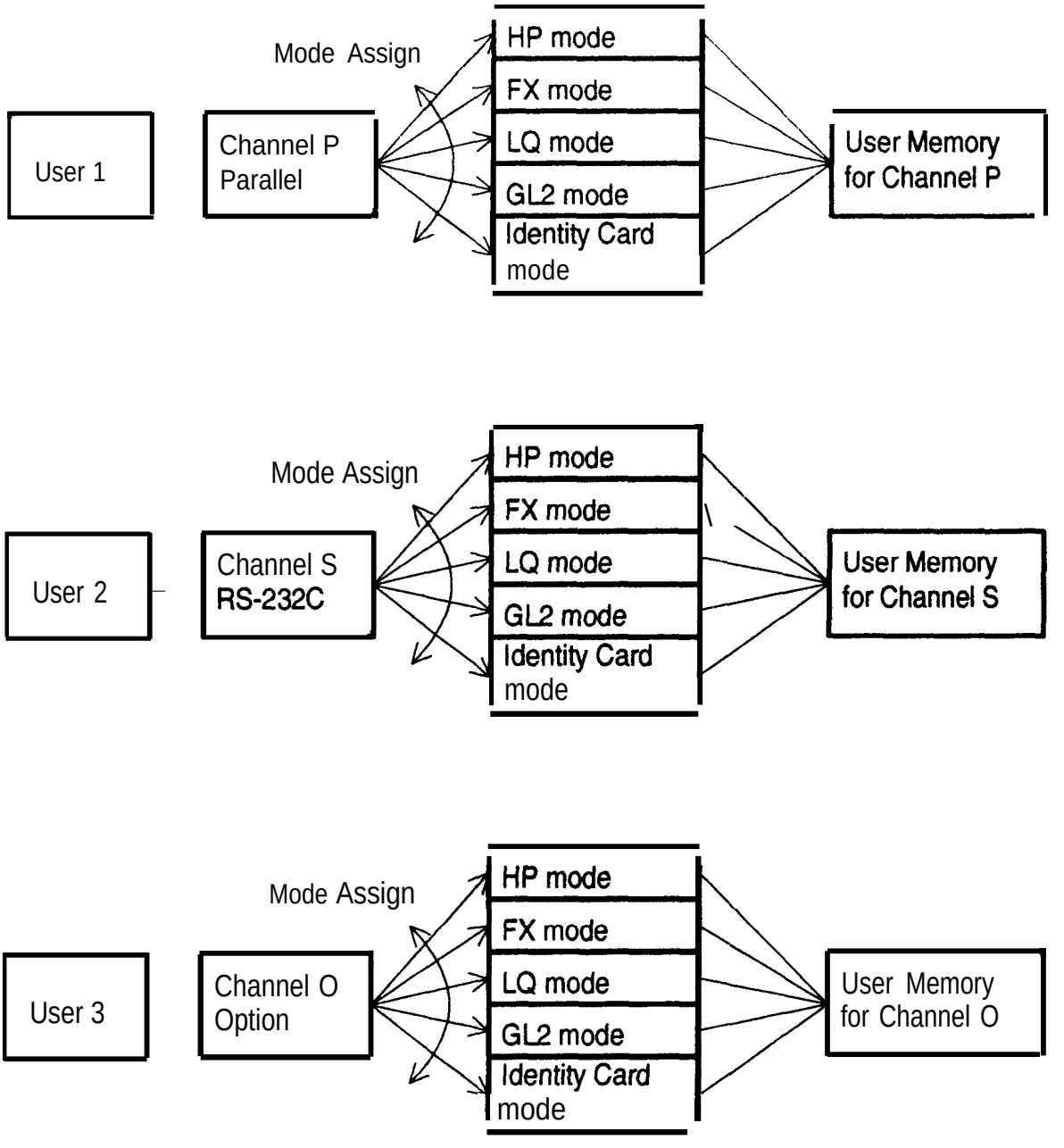


Figure 1-10. Individual Mode

Note: ***The ActionLaser 1000 does not have a serial interface. PostScript mode &m be assigned to only one channel of the three (or two).***

1.4.4.2 Auto Sense Mode

It is Possible to allocate each mode to CH P, CH S, or CH O. The entire user memory will be allocated to the channels that are used. The channel that receives the data first will print first.

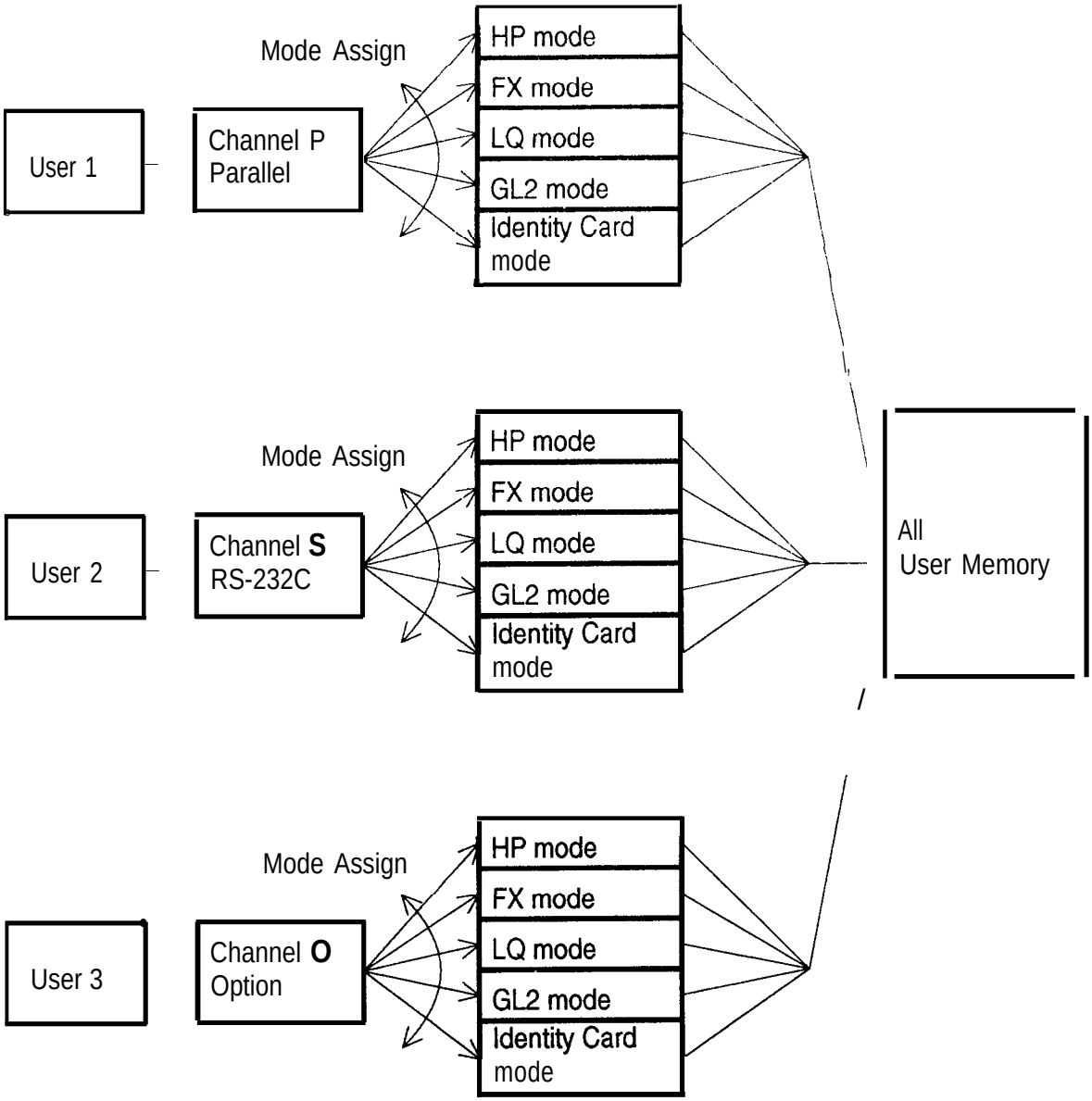


Figure 1-11. Auto Sense Mode

Note: ***The ActionLaser 1000 does not have a serial interface.***

1.4.4.3 Data Receive Buffer

The size of the data receive buffer for each interface (parallel, serial, and optional) can be assigned separately through Sele('ype.

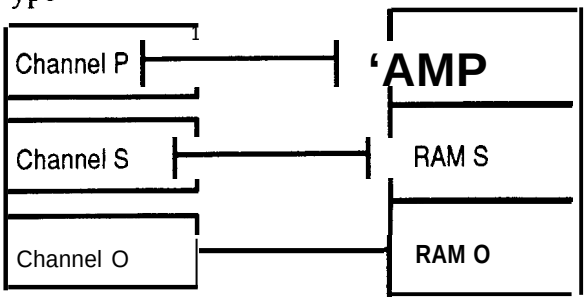


Figure 1-12. Receive Buffer Allocation

1.4.5 Controller RAM Status

This printer allocates the controller RAM to increase efficiency. The remaining RAM size can be shown using the MEMORY LEFT function in SelecType Level 1. The usable RAM size depends on user operation in the following cases:

1) The size of received data (except in optional EPSON CL and PostScript modes).
2) The FULL PRINT setting made in SelecType.
3) The RX-BUFFER SIZE setting made in SelecType.
4) Font downloading.
5) Bit-image (or raster graphics) downloading.
6) Form overlay registration/deletion (for optional GQ mode).
7) Macro registration/deletion (for HP mode).
8) Business graphics registration/deletion (for optional GQ mode).
9) The number of simultaneously used interfaces.

In 1), the size of memory used by the amount of data and the estimated by multiplying IN by 8 to 20 bytes.

In 2), the amount of memory used can be calculated, as described below, using the value "n'* defined for the FULL PRINT setting.

$$20\ \text{KB} \times n \qquad (0 \le n \le 62)$$

Settings that exceed the ranges shown below waste memory capacity. The system goes into full-page buffer mode if any of the following maximum "n" values is reached. (Printing is done after the complete image for the page has been developed in RAM.) However, the "n" value should be set to the minimum necessary value. It is recommended that there be a total of 1.5MB or more memory when using the full page buffer mode.

A4: n ≤ 51, A5: n ≤ 35, B5: n ≤ 43, LT: n ≤ 47, LG: n ≤ 62
HLT: n ≤ 36, EXE: n ≤ 45, GLG: n ≤ 57, GLT: n ≤ 45
F4: n ≤ 57, C1O: n ≤ 41, MON: n ≤ 31, C5: n ≤ 38, D: n ≤ 37

In 3), the amount of memory used is the size of the RX-BUFFER SIZE setting in SelecType.

However, in 6) and 7), a memory overflow may occur when the job is executed (printed) even though registration is possible. (This is because the amount of memory necessary for execution is approx. 8 to 20 bytes.) In 8), all the allocated memory will be used.

If a memory shortage occurs:
PAGE BUFFER FULL will be displayed for 1).
INSUFF. MEMORY will be displayed for 4) through 8).

For 2) and 3), setting SelecType will not be possible. It is suggested that you change the FULL PRINT setting if SET FULL PRINT is displayed.

It is necessary to install optional memory if INSUFF. MEMORY or PAGE BUFFER FULL is displayed.

1.4.6 Optional Memory

If you have difficulty printing complex, graphics-intensive pages of if you regularly use downloaded fonts, you may need to install the optional memory (RAM) chip sets on this printer's controller board. The printer's controller board comes with either 0.5MB of RAM installed (for the EPL-5000/ActionLaser 1000) or 1.0MB of RAM installed (for EPL-5200/ActionLaser 1500). Two types of RAM chip sets are available.

0.5MB RAM chip set
Each set contains four 256K bit x 4,80 ns, DRAM 20-pin DIP chips

2.0MB RAM chip set
Each set contains four 1 Mbit x 4,80 ns, DRAM 20-pin DIP chips

By installing RAM chip sets, you can increase the printer's memory to a total of 6.5MB (for the EPL-5000/ActionLaser 1000) or 5.0MB (for EPL-5200/ActionLaser 1500), including the resident memory.

The table below describes the RAM chip combinations.

Table 1-18. RAM Chip Combinations

Chip Set Installed	Total RAM	
	EPL-5000 ActionLaser 1000	EPL-5200 ActionLaser 1500
No chip sets	0.5MB	1.0MB
One 0.5MB chip set	1.0MB	1.5MB
Two 0.5MB chip sets	1.5MB	2.0MB
Three 0.5MB chip sets	2.0MB	*
One 2.0MB chip set	2.5MB	3.0MB
One 2.0MB chip set One 0.5MB chip set	3.0MB	3.5MB
One 2.0MB chip set Two 0.5MB chip sets	3.5MB	*
Two 2.0MB chip sets	4.5MB	5.0MB
Two 2.0MB chip sets One 0.5MB chip set	5.0MB	*
Three 2.0MB chip sets	6.5MB	*

* On the EPL-5200/ActionLaser 1500, one 0.5 MB chip set is initially installed, so you can add only two more optional chip sets.

1.4.7 Emulation Mode Switch Function

This section describes the emulation mode switch function.

1.4.7.1 Emulation Switch by SPL

The three types of emulation switch functions described below are available on this printer. They are referred to as SPL (Shared Printer Language).

EJL: EPSON Job Language

This is Epson's original language system. It is able to skip among various destinations, as shown in Figure 1-13.

PJL: Printer Job Language

This is HP's original language, which is available with the LaserJet" IIISi printer.
It is able to move only among PS, PCL, and EJL. Other modes are able to entry to PJL only. The precise specifications for this language are based on the HP LaserJet® IIISi.

ES: Emulation Switch

This is a method offered from Adobe, which is able to switch between PostScript" and PCL. The precise specifications are based on software from Adobe.

The figure below shows three types of mode switching.

Neither EJL nor PJL switches the mode directly. They first exit.the current mode and return to EJL or PJL. Then they enter another mode.

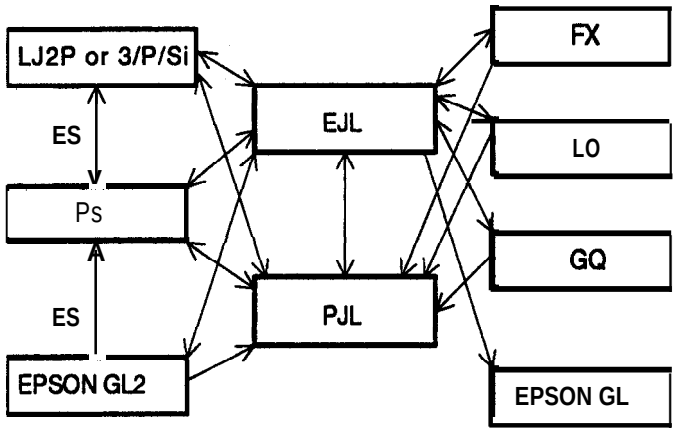


Figure 1-13. Emulation Switch by SPL

1.4.7.2 Intelligent Emulation Switch

The Intelligent Emulation Switch (IES) automatically switches the emulation switch mode, depending on the data sent from thehostcomputer through one of the interface channels. It is able to switch between PostScript™ and other modes as shown in the figure below.

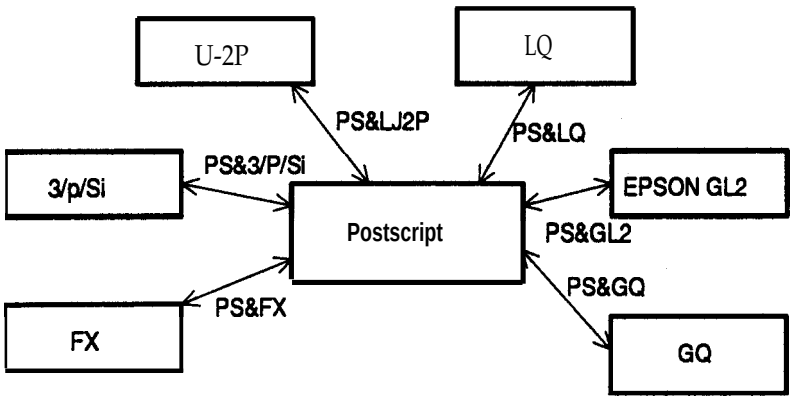


Figure 1-14. Intelligent Emulation Switch

1.4.8 Resolution Improvement Technology

The EPL-5200/ActionLaser 1500 and the EPL-5000/ActionLaser 1000 with the optional Epson PCL5/RITech Upgrade board have RITech (Resolution Improvement Technology), which is designed to improve print quality. By this method, the dot map data extracted from the image data is reassembled to improve print data.

The main improvement of this technique is in eliminating "jaggies" in diagonal lines. Also, it is most effective when the dot map data fits the development characteristics of the printer mechanism well. It is therefore necessary to set appropriate values in SelecType mode.

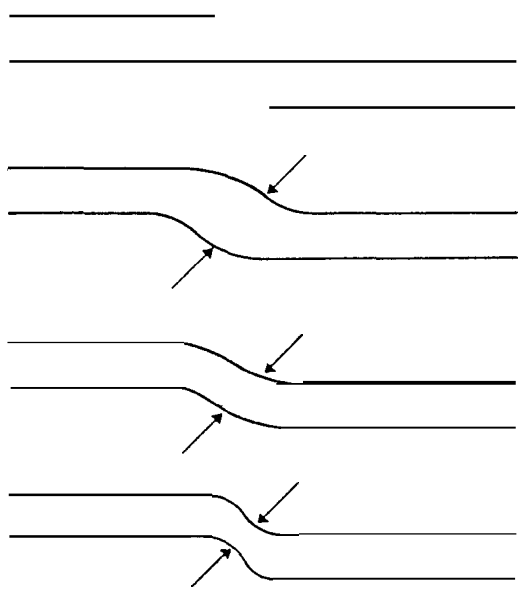


Figure 1-15. Effect of RITech

Note: ***R/Tech is not as effective for printing a mesh pattern or gray scale. In such cases, R/Tech must beset to OFF. (The default setting is MEDIUM.) Since the R/Tech effect depends on the toner condition, it should be adjusted when the imaging cartridge is replaced or after the imaging cartridge is used for a long time.***

The following settings are available in SelecType Level 2 for RITech: HEAVY, MEDIUM, LIGHT, OFF. When the toner density of area A is almost the same as that of area B (as shown in the figure below), it is the optimum setting. In other words, the optimum. setting is achieved when it is difficult to distinguish the shape of area A from that of B.

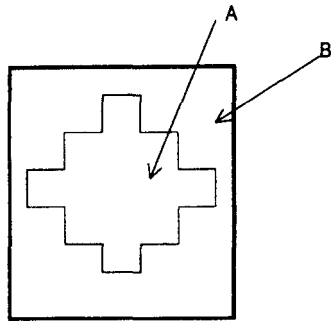


Figure 1-16. RITech Adjustment

1.4.9 EEPROM Reset

EEPROM reset operations are only required when the main board replacement, EEPROM replacement, or firmware version is revised, and these operations are specified in the accompanying documentation.

- EEPROM memory reset (excluding clearing of the page counter and toner counter)

  Turn on the power while pressing the ON LINE, FEED, and CONTINUE buttons simultaneously, the printer enters EEPROM clear mode, and the message STARTUP ERROR is displayed on the LCD. Press the left or right cursor button (default paper size selection, A4 or letter). All settings stored in EEPROM are replaced with the factory default settings, except the page counter and the value for toner left in the imaging cartridge.

- EEPROM memory all clear (including clearing of the page counter and toner counter)

  Turn on the power while pressing the ON LINE, FEED, and CONTINUE buttons simultaneously. Afterward, both the page counter and toner counter can be cleared by pressing either the left or right cursor button and holding down the CONTINUE button, while the message START UP ERROR is displayed on the LCD.

Note: This printer's STATUS SHEET is changed to EPL-5200/Action Laser 1500, while set the optional PCL5/RITech Upgrade Board and EEPROM memory all clear.

1.5 MAIN COMPONENTS

To simplify maintenance and repair, the main components of the EPL-5000/EPL-5200/ActionLaser 1000/ActionLaser 1500 have been designed for easy removal and replacement. The main components are:

- ❑ C108 MAIN Board — Video controller circuit board
- ❑ C82907* ROM-B Board — PCL5® program and fonts ROM board
- ❑ Control Panel
- ❑ PWB-A Board — Engine controller circuit board
- ❑ PWB-E Board — Power supply circuit board
- ❑ PWB-F Board — High voltage supply circuit board
- ❑ PRINTHEAD UNIT — Optical unit
- a FUSING UNIT
- ❑ Drive Unit
- ❑ Imaging Cartridge
- ❑ Housing
- cl Lower Paper Cassette Unit (optional)
- ❑ Face-up Output Tray (optional)

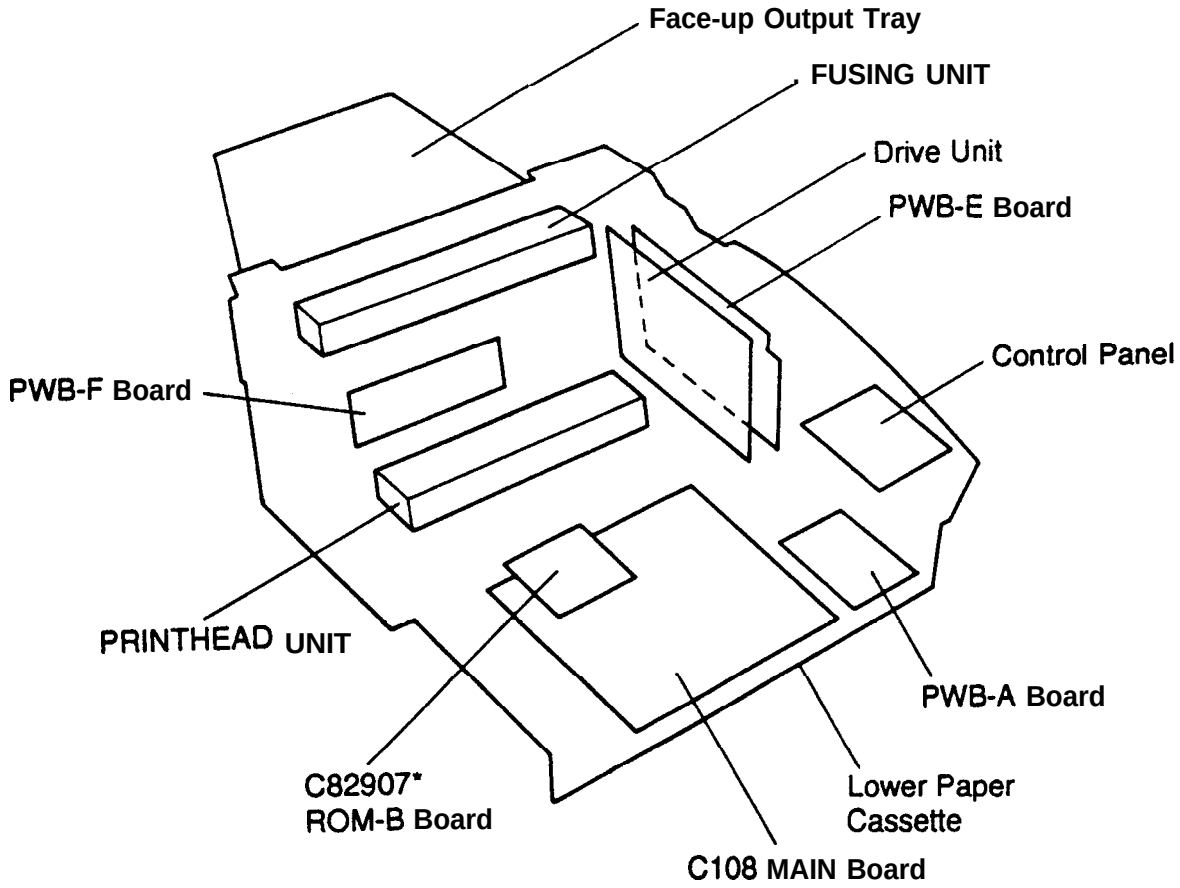


Figure 1-17. Component Layout

1.5.1 C108 MAIN Board

The C108 MAIN board is video controller board. The functions of this board main are receiving print data from host, generating the print image (video), and sending the print image to the engine controller via the video interface. A 16-bit 16.67 MHz CPU MC68000 (location: IC2) is used, and the following memory chips and custom ICs are assigned to the 16MB memory space.

■ Memory chips

8M-bit MASK ROM (IC5) or 8M-bit EPROM (IC5) or two 4M-bit EPROM (IC5,7)
4M-bit DRAM (IC9)
1 M-bit DRAM (IC31, 32,33, 34)
16K-bit EEPROM (IC8)

■ Custom ICs

Standard cell E05A83 (IC4)
Gate array E05A84 (IC3)

■ Others

Serial interface driver/receiver MAX238 (IC30)

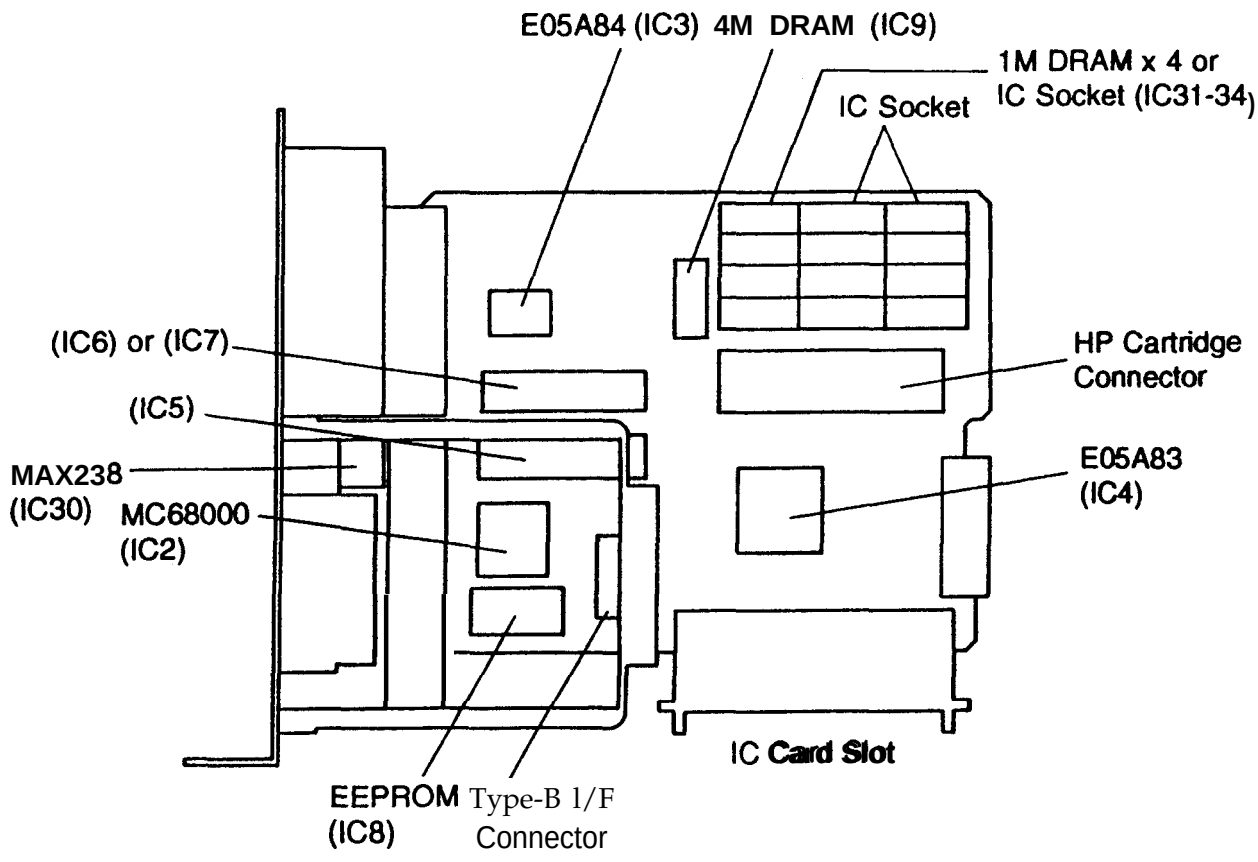


Figure 1-18. C108 MAIN Board

There are four types of C108 MAIN boards used as after service parts. The following table shows differences in them.

Table 1-19. Differences in Components for the C108 MAIN Board

	EPL-5000	Action Laser 1000	EPL-5200	Action Laser 1500
IC31,IC32, IC33, IC34	IC sockets	IC sockets	1 M DRAMs (directly soldered to board)	1 M DRAMs (Directly soldered to board)
Serial interface connector	Mini screw type connector	No connector	Mini screw type connector	Inch screw type connector
IC6	IC socket	None	IC socket	None
IC30	MAX238	None	MAX238	MAX238
IC3	E05A84BB or E05A84BC	E05A84BB or E05A84BC	E05A84BC	E05A84BC

1.5.2 C82907* ROM-B Board (PCL5/RITech Upgrade Board)

The C82907* ROM-B board has the PCL5® ROM and RITech IC. The printer changes from PCL4® to a PCL5® printer with the RITech enhancement, once this board is attached to connectors CN3 and CN4 on the C108 MAIN board. In the EPL-5200/ActionLaser 1500, this board is standard. In the EPL-5000/ActionLaser 1000, this board is optional.

- Memory chips

  8M-bit MASK ROM (IC3) or 8M-bit EPROM (IC3) or two 4M-bit EPROM (IC6,7)
  64K SRAM (IC2)

- Custom IC

  E05A74 (IC1)

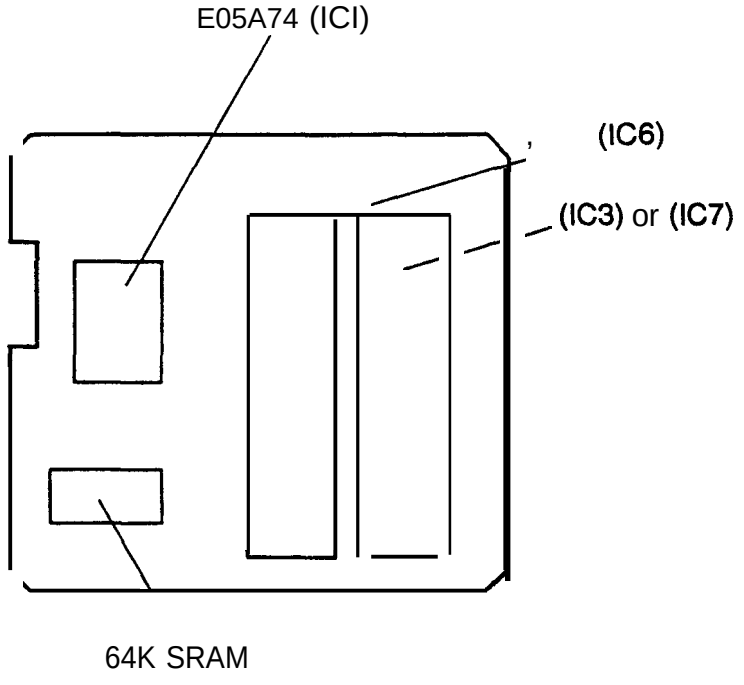
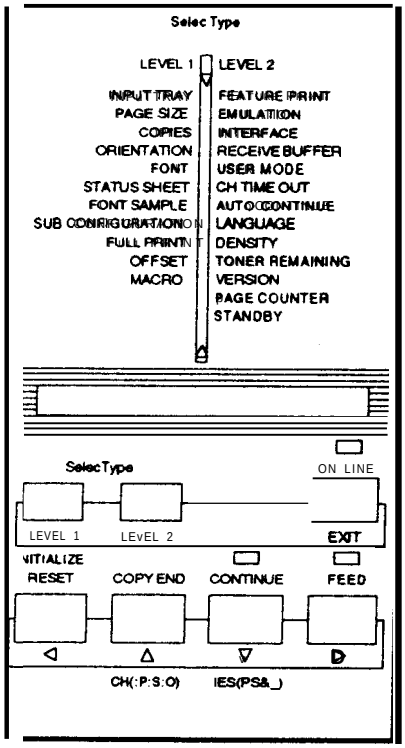


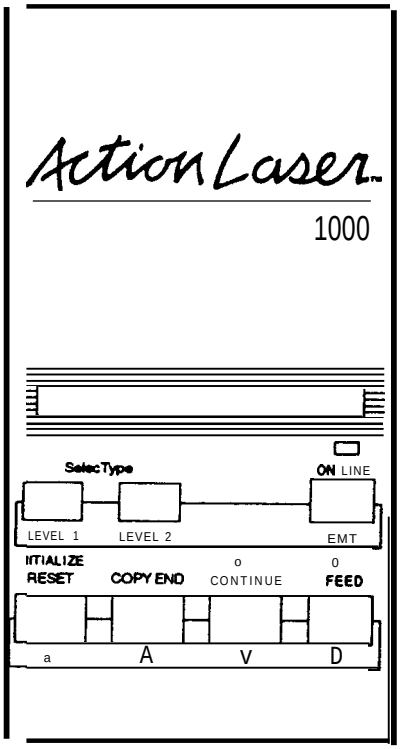
Figure 1-19. C82907*ROM-B Board

1.5.3 Control Panel

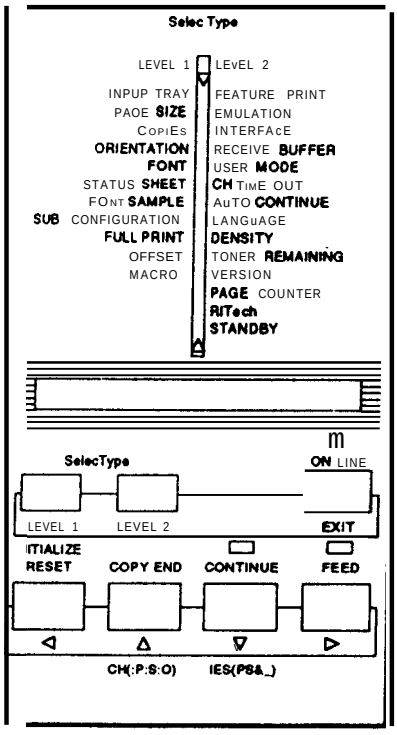
The control panel includes a **20** column x 1 row LCD panel, which provides many functions for the printer (e.g., displaying error messages or printer operation status). There are four types **of control panels.**



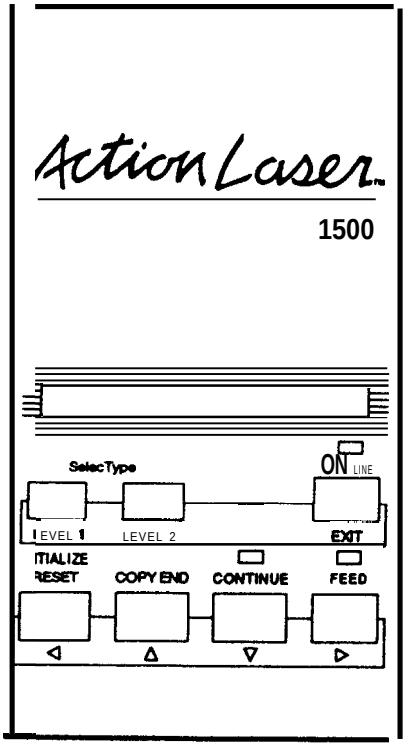
EPL-5000



Action Laser 1000



EPL-5200



Action Laser 1500

Figure 1-20. Control Panel

1.5.4 PWB-A Board

This is the engine controller board. It consists of an M37451M4 8-bit CPU (including a MASK ROM) and a gate array. The board controls laser seaming (the polygon mirror drive motor), image synchronization, laser beam pulse width, and power.

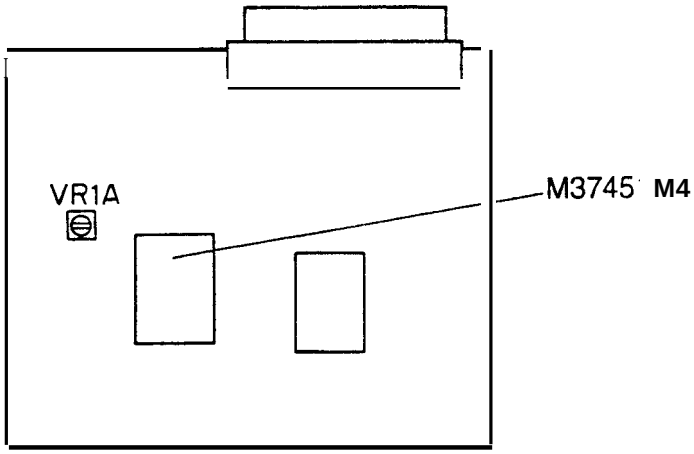


Figure 1-21. PWB-A Board

1.5.5 PWB-E Board

The PWB-E is the power supply board, which consists of a switching regulator circuit. It converts the AC line voltage into +24 V and +5 VDC voltages. There are two types of power supply board, the 100/120 V type and 220/240 V type. The difference between the two circuits is only in the input section.

CAUTION

Do not touch VR1E on PWB-E board. This volume is for factory setting only.

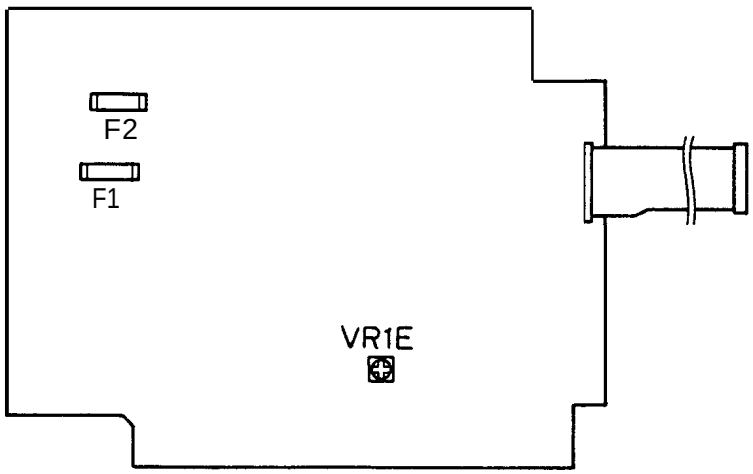


Figure 1-22. PWB-E Board

1.5.6 PWB-F Board

The PWB-F is the high voltage supply circuit board. It converts the development bias, OPC drum charge bias, and image transfer bias.

CAUTION

Do not touch VR1F and VR2F on the PWB-F board. These volumes are for factory setting only.

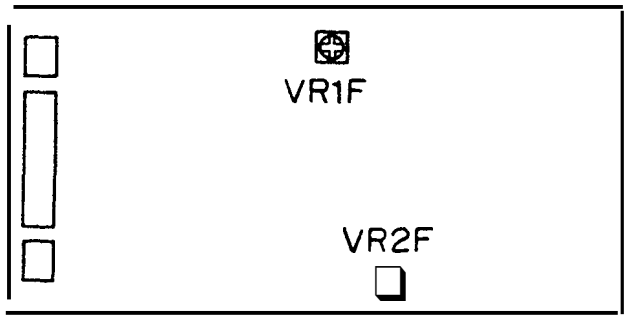


Figure 1-23. PWB-F Board

1.5.7 PRINTHEAD UNIT

The printhead unit consists of the laser diode (semi-conductor laser), the scanner motor which drives the polygon mirror for laser scanning, and several mirrors and lenses. The laser beam generated by the laser diode is conducted to the OPC drum surface by way of the polygon mirror, as well as several mirrors and lenses, to create a latent electro-photographic image on the drum.

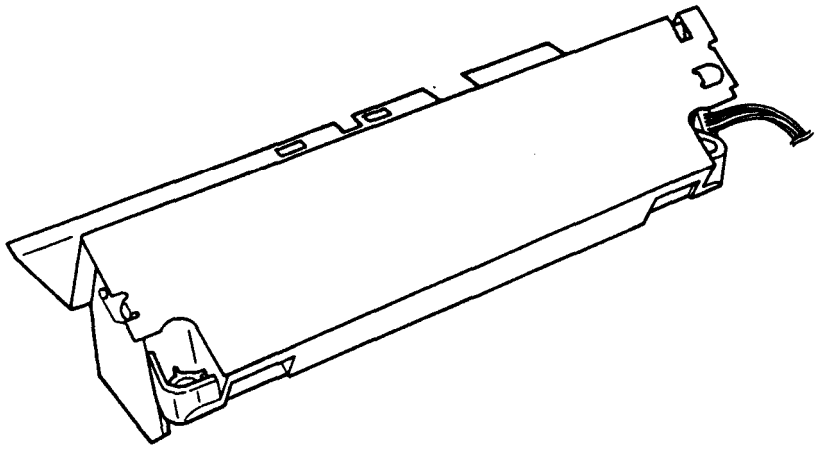


Figure 1-24. PRINTHEAD UNIT

1.5.8 FUSING UNIT

The fusing unit fixes the toner to the paper using heat and pressure. This unit has a heater lamp, thermistor, and thermal fuse. There are two types of fusing units, the 120 V type and the 220/240 V type. The difference between them is only the heater lamp.

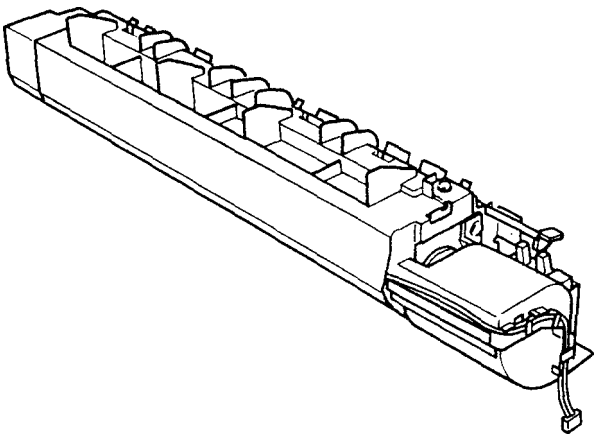


Figure 1-25. FUSING UNIT

1.5.9 Drive Unit

The drive unit consists of the main motor and a series of gears and clutches. It drives the paper transport rollers, OI?C drum, sleeve roller, fusing roller, and some other mechanisms.

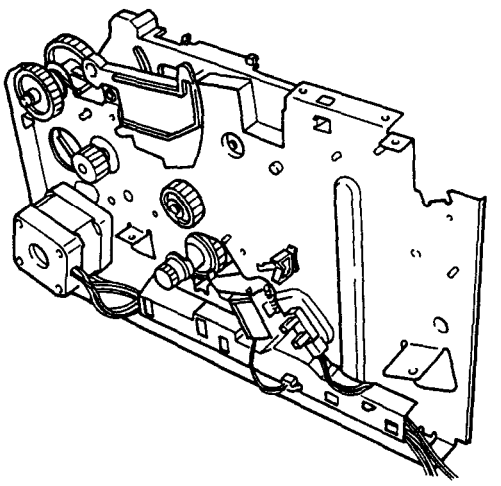


Figure 1-26. Drive Unit

1.5.10 IMAGING CARTRIDGE

The core mechanisms of the printing process, such as charging, developing, and cleaning, are integrated into this imaging cartridge.

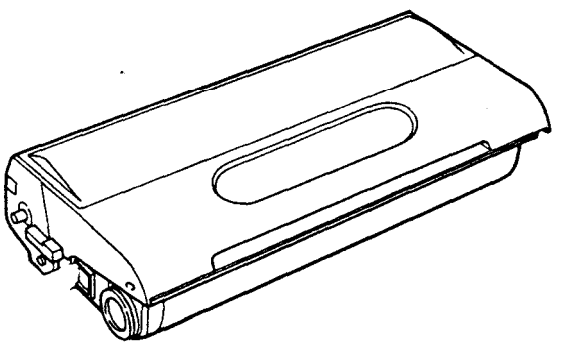


Figure 1-27. IMAGING CARTRIDGE

1.5.11 Lower Paper Cassette

The optional lower paper cassette allows you to feed up to an additional 250 sheets of A4 or letter-size paper into this printer.

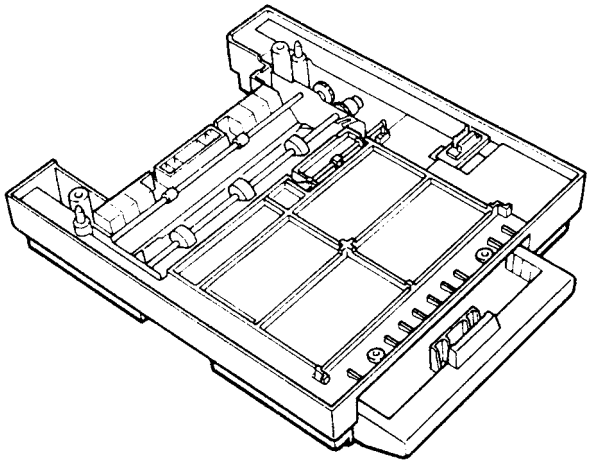


Figure 1-28. Lower Paper Cassette

1.5.12 Face Up Output Tray

The face-up output tray is an optional tray useful for feeding single sheets of paper types, such as envelopes, transparencies, labels, or heavy paper. The face up feeding method reduces curling, and the tray catches the paper at the paper ejection area at the top back of the printer.

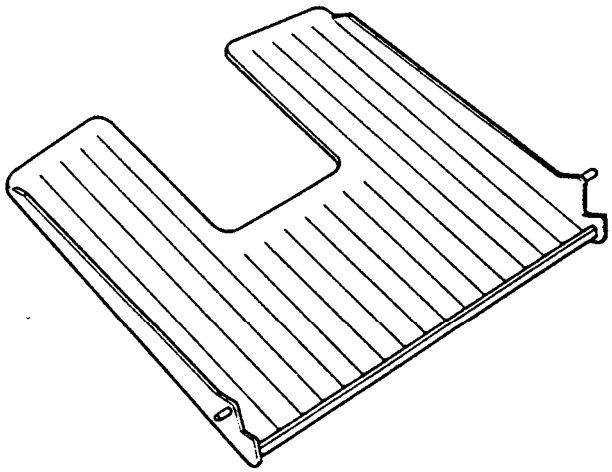


Figure 1-29. Face Up Output Tray

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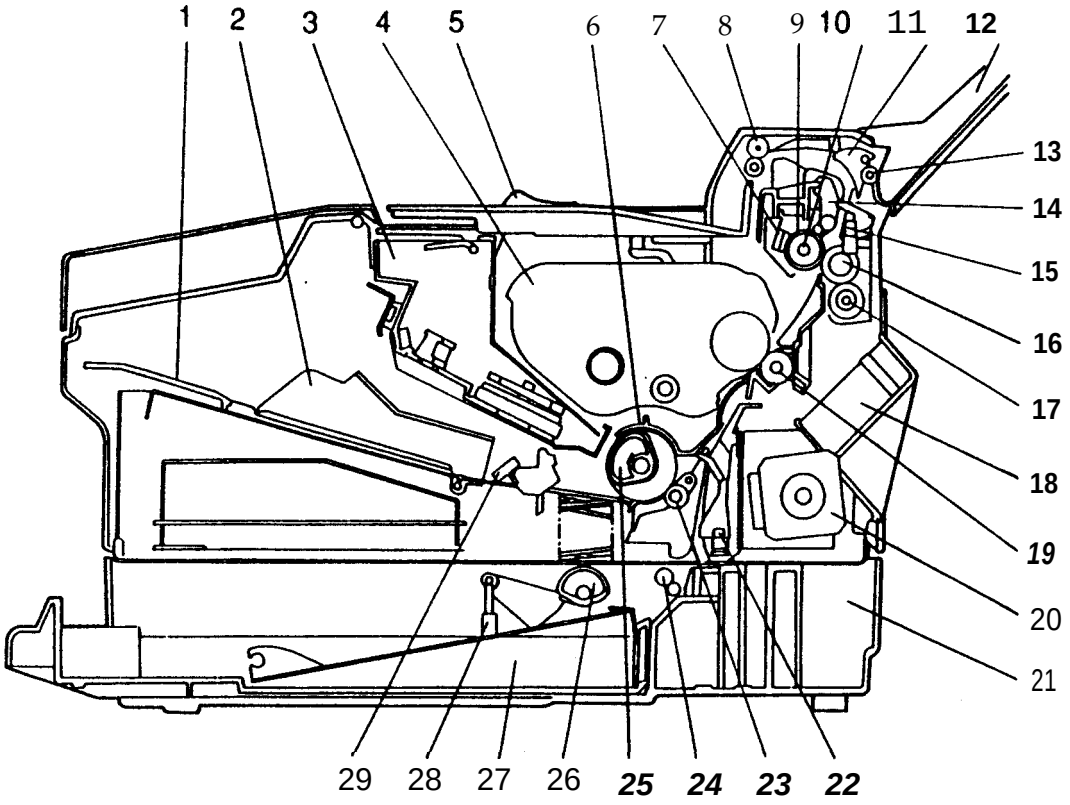
2.1 ENGINE OPERATION

This section describes the functions and operating principles of the EPL-5000/5200, ActionLaser 1000/1500 engine.

Figure 2-1 shows the locations and names of the main engine components.



1. Paper tray
2. Paper guide
3. Printhead unit
4. Imaging cartridge
5. Upper lock release lever
6. Roller cover
7. Thermistor (TH1)
8. Face-down exit roller
9. Upper fusing roller
10. Heater lamp (Hi)
11. Face-up/face down switching guide
12. Face-up tray (option)
13. Face-up exit roller
14. Fusing separator
15. Paper exit sensor (PC3)
16. Lower fusing roller
17. Fusing cleaning roller
18. cooling fan
19. Image transfer roller
20. Main motor (Ml)
21. Lower paper cassette (option)
22. Paper take-up sensor (PC2)
23. Transport roller
24. Transport roller (for option)
25. Paper take-up roller
26. Paper take-up roller (for option)
27. Paper cassette (for option)
28. Paper empty sensor (PC4) (for option)
29. Paper empty sensor (PC1)

Figure 2-1. Main Components

2.1.1 Print Process

This section describes the print process from paper feeding to paper exit.

Figure 2-2 shows a diagram of the print process.

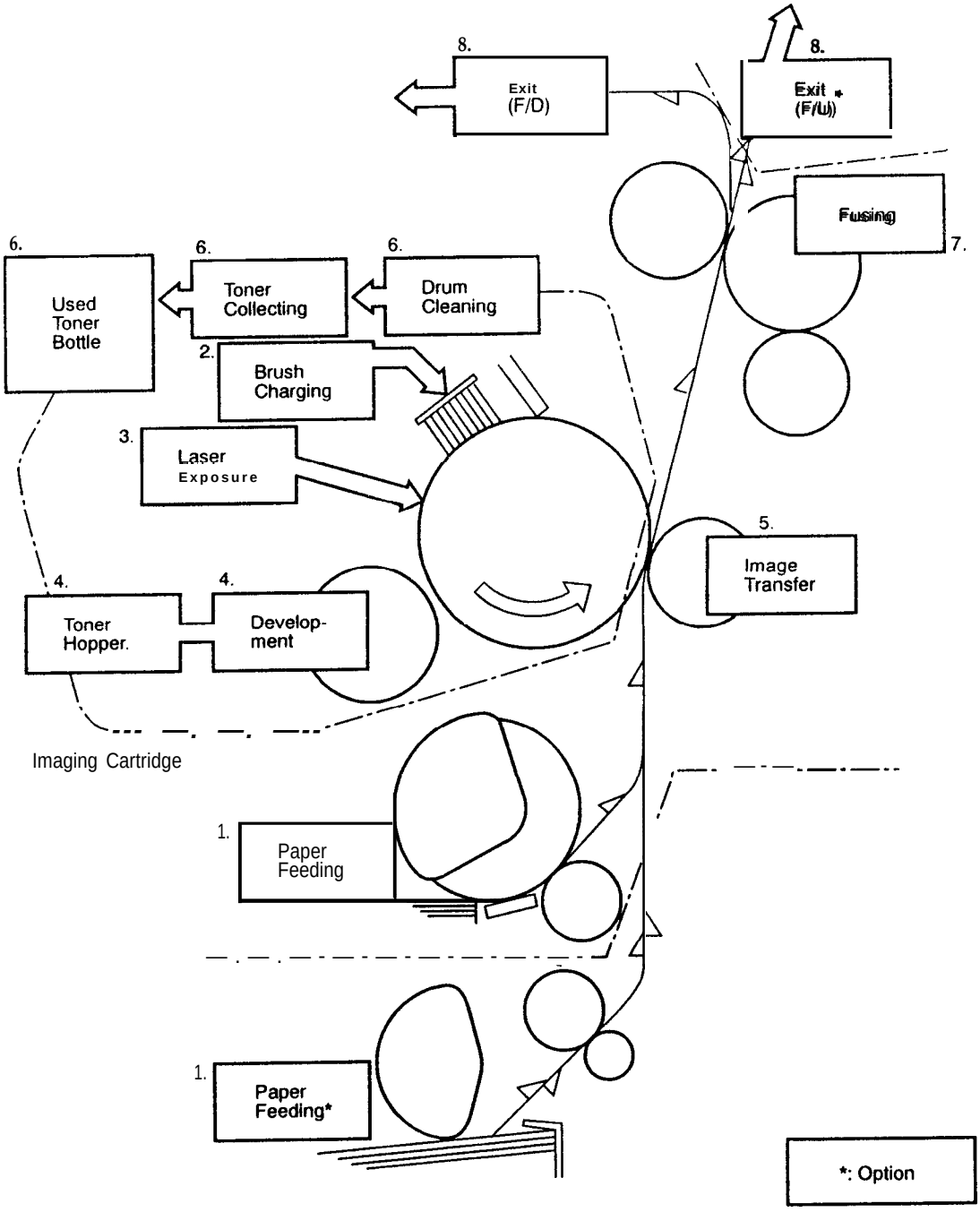


Figure 2-2. Print Process Diagram

2.1.1.1 Paper Feeding

There are two methods of feeding the paper into the printer. One is by using the multi-purpose tray (standard tray), and the other is by using the optional 250-sheet lower paper cassette.

Paper-out conditions are detected by the paper empty sensor, located above the paper tray or the cassette. While paper is in the tray or cassette, the detection lever for the paper empty sensor is lifted. When the paper supply runs out, the detection lever is lowered, causing the shutter to interrupt light from the LED to the photo-transistor. This causes the signal to go HIGH, informing the engine driver that the paper tray or the cassette is empty.

When the paper take-up solenoid is actuated, the paper take-up roller rotates and feeds the first page. The paper take-up roller stops after one rotation. Unlike the EPL-7000/7100/7500 and EPL-8000/8100, which have a synchronizing roller, the EPL-5000/5200 and ActionLaser 1000/1500 have no synchronizing roller is installed. The timing to align the leading edge of the page with image is detected by the paper take-up sensor.

When the page is on top of the paper take-up sensor, the detection lever is lowered, allowing light from the LED to reach the photo-transistor. This causes the signal to go HIGH, informing the engine driver that paper has been detected.

The paper exit sensor is located beyond the fusing roller in the paper path. When paper passes the paper exit sensor, the detection lever is lowered, allowing light from the LED to reach the photo-transistor. This causes the signal to go HIGH, informing the engine driver that paper has been delivered.

Multi-Purpose Tray (Standard Tray)

The paper guide can be moved to fit against the sides of various sizes of paper, allowing them to be fed.

Although the paper take-up roller stops after one rotation, the transport rollers continue to feed the first page, because these rollers are independent of the paper take-up roller. At this time, the depression cam attached to the paper take-up roller depresses the paper lift-up plate to prevent the feeding of a second sheet.

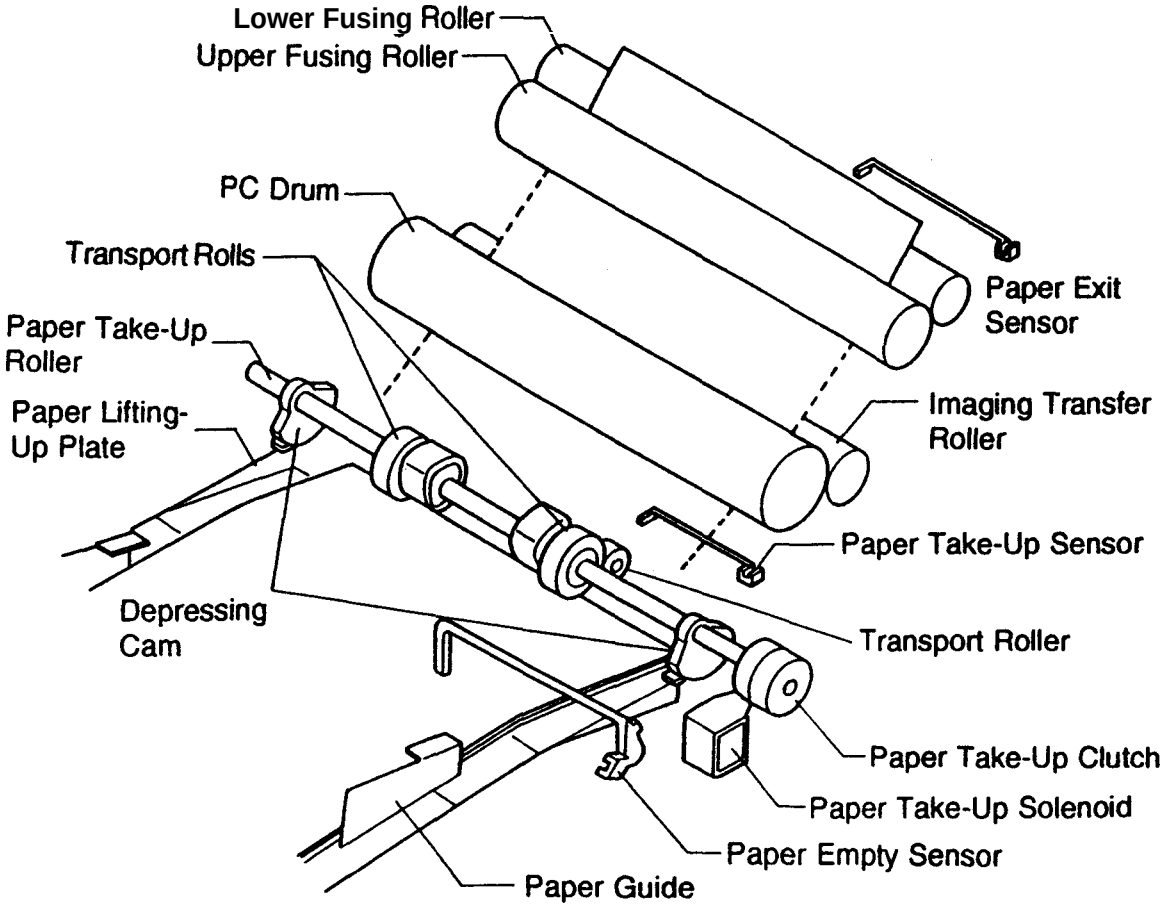


Figure 2-3. Paper Feeding from the Multi-Purpose Tray

Lower Paper Cassette

A maximum of 250 sheets can be loaded in the 250-sheet lower paper cassette (option). The cassette must be capable of handling the paper size, however. (The lower paper cassette unit can hold letter, A4, or legal paper.)

The driving force for paper feeding and transport is from the transmission gear. All electrical controls are performed on the printer side through the coupling connector.

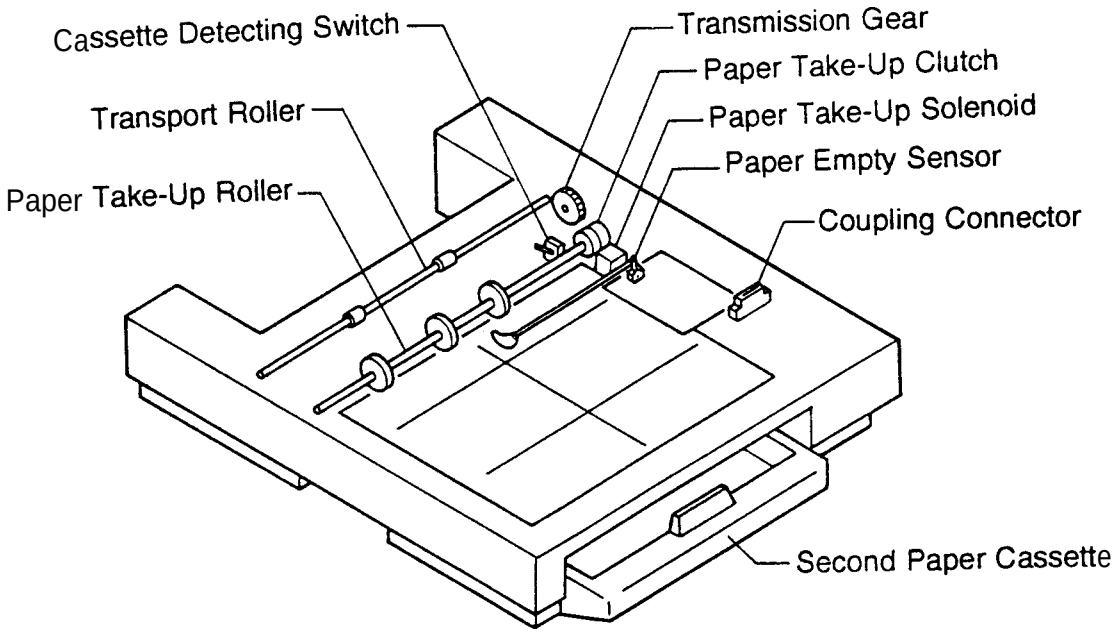


Figure 2-4. Paper Feeding from the Lower Paper Cassette

2.1.1.2 Drum Charge

Drum charge is the process of charging the PC drum with static electricity before laser exposure. This printer uses a brush charge method, rather than the corona charge method, to charge the drum. In the brush charge method, there is no generation of ozone as a result of corona discharge. This method also allows the drum to be charged at a low voltage, because a direct electric load is applied to the PC drum.

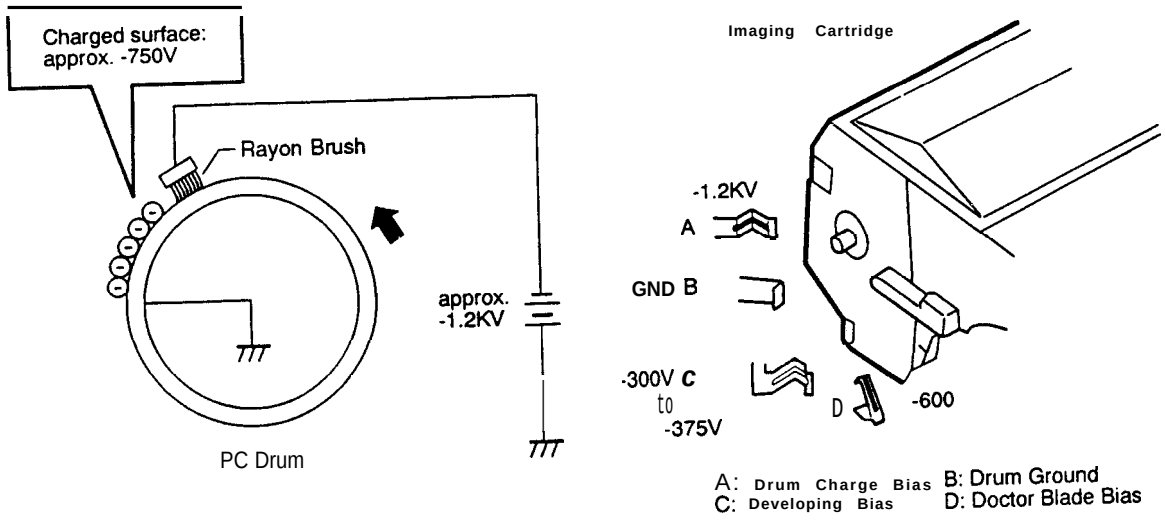


Figure 2-5. Drum Charge

2.1.1.3 Laser Exposure

Laser exposure is the process of creating an invisible static electric image on the PC drum with laser beams emitted from the printhead unit. The mirror motor (scanner motor) rotates the four-sided mirror counterclockwise to produce a laser light scan. (One side of the mirror produces one scan.) The SOS (start of scan) sensor detects the laser rays from the SOS mirror and outputs the SOS signals to make the starting position of each line of the image uniform.

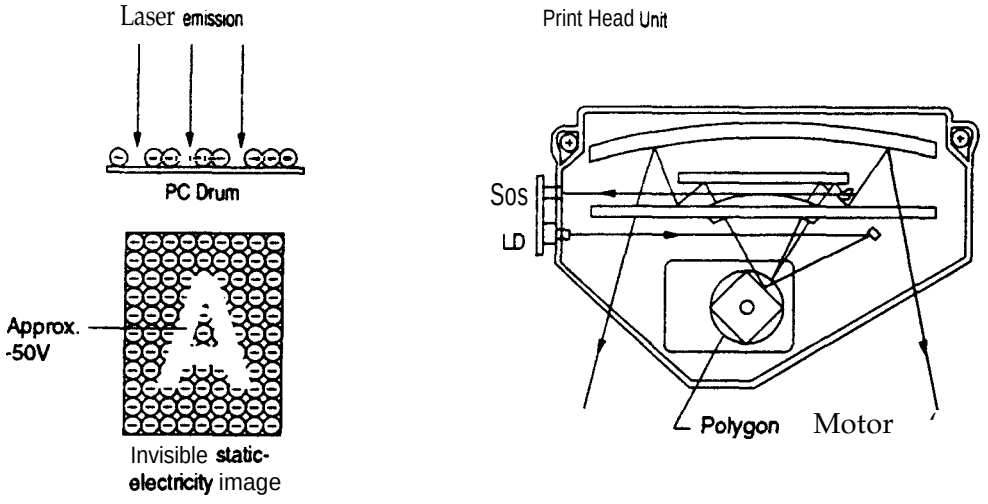


Figure 2-6. Laser Exposure

2.1.1.4 Development

Development is the process of creating a toner image on the PC drum by applying toner to the invisible static electric *image.* The doctor blade spreads a thin, even coat of toner over the flexible sleeve. When the toner passes between the doctor blade and the flexible sleeve, it becomes negatively charged. The flexible sleeve transports toner to the surface of the PC drum and controls the development with the developing bias voltage.

No positive toner is transported, and the doctor blade is charged to prevent printing from having a foggy background.

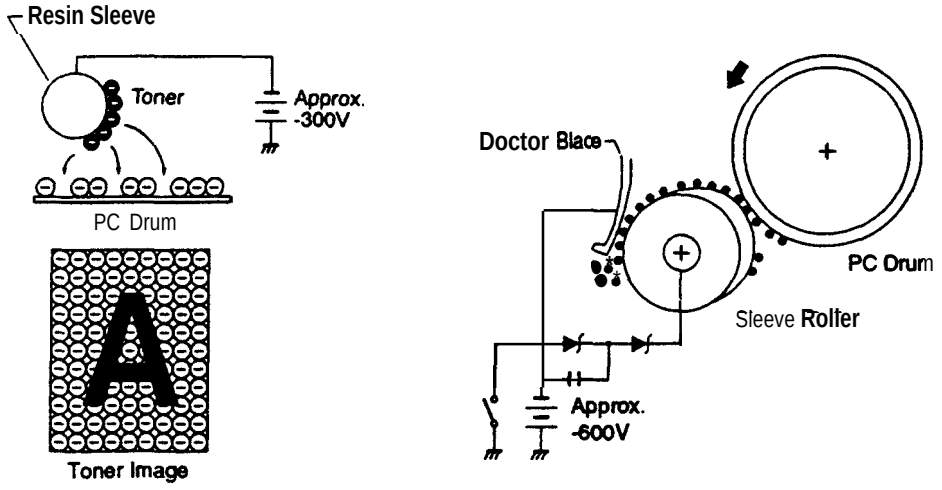


Figure 2-7. Development

2.1.1.5 Drum Cleaning

After the image is transferred onto paper, any remaining toner on the PC drum is scraped off by the cleaning blade and collected in the used toner bottle.

2.1.1.6 Image Transfer

Image transfer is the process of transferring the toner image created on the PC drum during the developing process to the paper. This printer uses the roller image transfer method, instead of corona image transfer, as the image transfer process. In roller image transfer, there is no generation of ozone as there is with corona discharge. Also, there is no blurring caused by motion in the image transfer, because the image transfer roller is maintained for the pressure bonding of the paper with the PC drum.

A reverse bias voltage is applied so that the positive toner is not transferred onto the image transfer roller. (The drum charge bias voltage is used.)

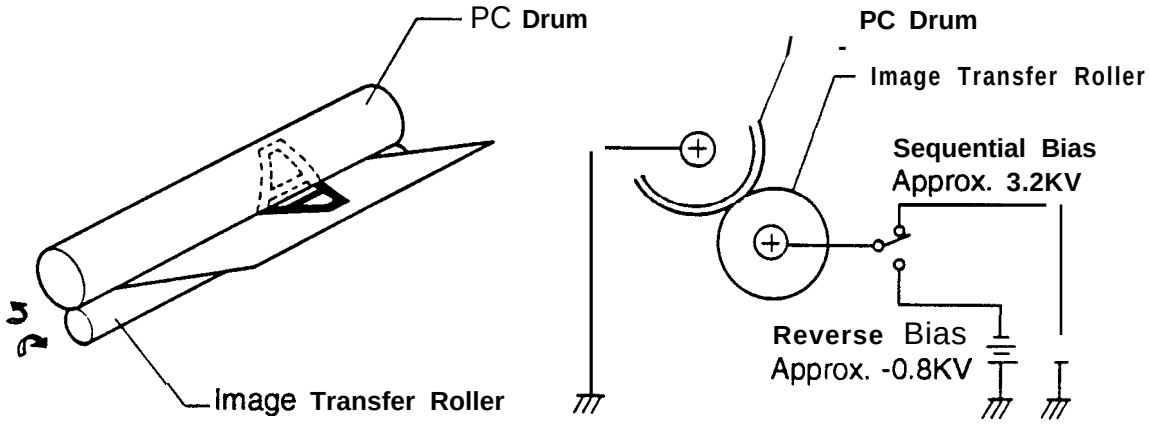


Figure 2-8. Image Transfer

2.1.1.7 Fusing

Fusing is the process of fixing the toner image transferred during the image transfer process onto the paper. This printer uses the heating roller method for fusing. The heating roller method fixes the toner image with an upper fusing roller that is heated by the heater lamp. The printer uses the cleaning roller to clean that roller if it becomes dirty.

After power is turned on, the heater lamp lights up until the temperature of the upper fusing roller reaches 165°C (329°F). After warm UP, the mechanical control board controls the ON/OFF operation of the heater lamp, based on the TH1 signals from the thermistor.

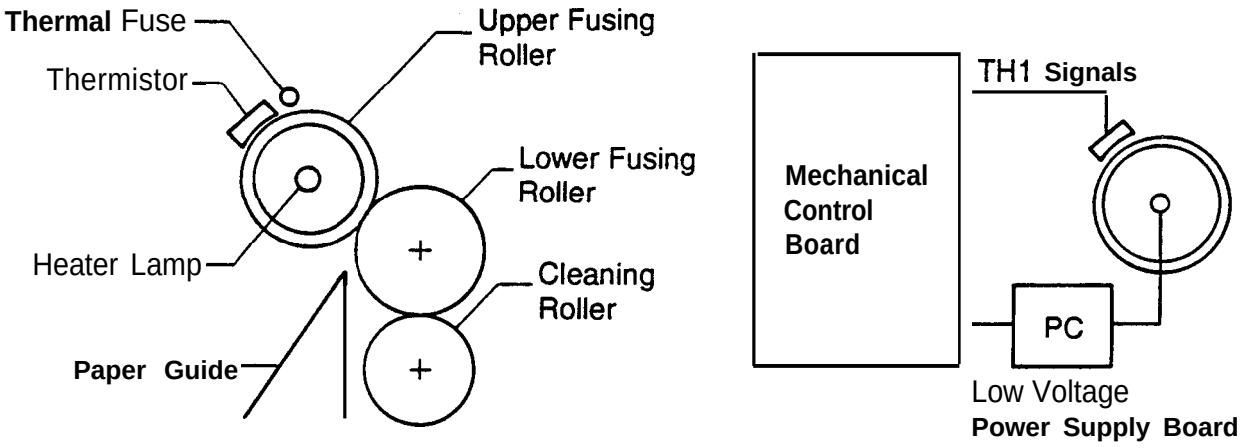


Figure 2-9. Fusing

2.1.1.8 Paper Exit

The paper on which the toner image has been fused is fed to the face-down tray or the face-up tray.

2.1.2 Engine Control

This section describes engine control, the power supply board, and the high voltage supply board. The engine is controlled by engine controller board (PWB-A board). Figure 2-10 shows an engine controller connecting diagram.

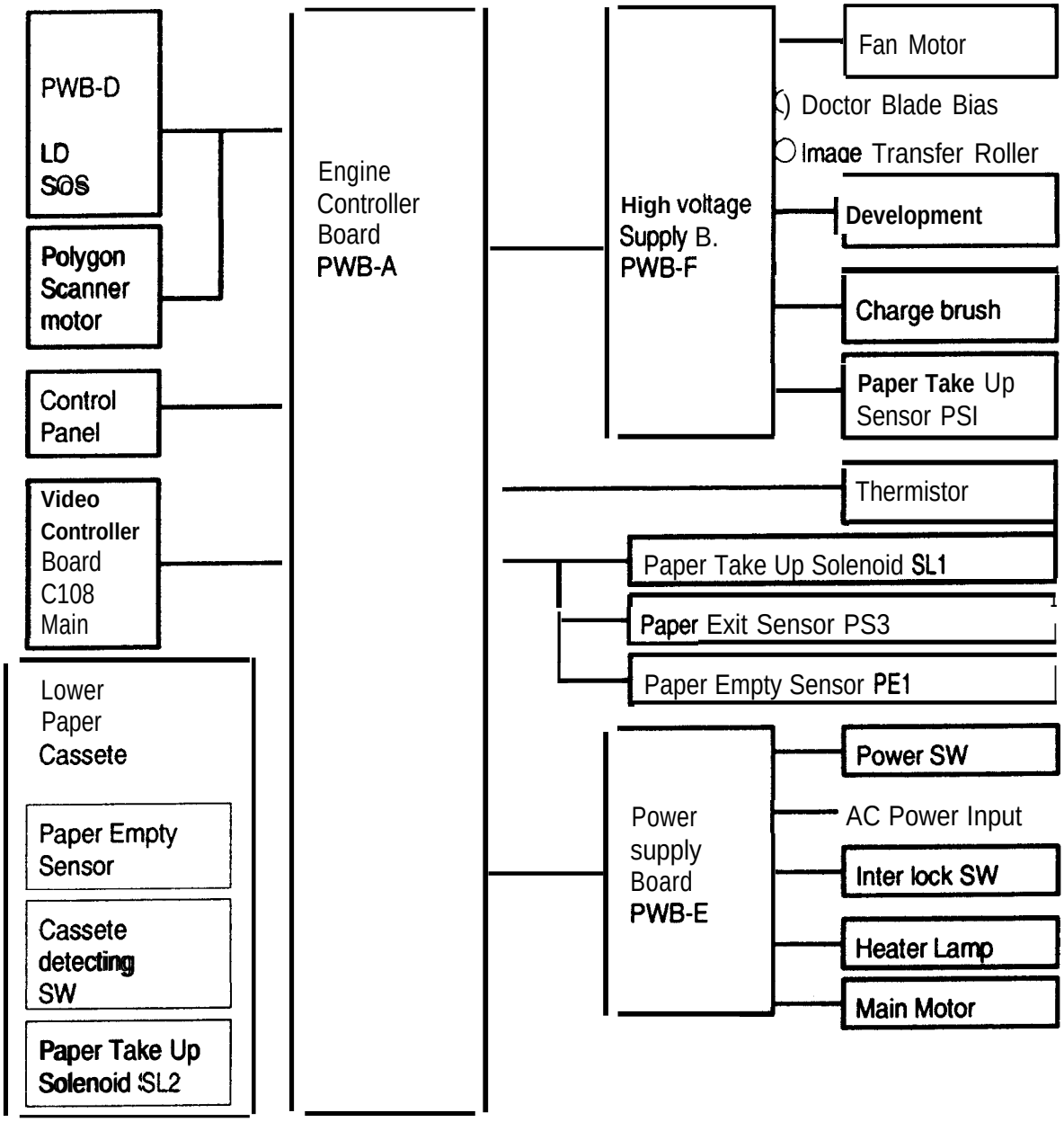


Figure 2-10. Engine Controller Connecting Diagram

2.1.2.1 Main Motor Functions and Control

power from the main motor (Ml) drive is used for the P/C (photo conductor) drive, the developing drive, the fusing drive, the standard paper slot feeding drive, and the lower paper cassette (option) feeding drive. Figures 2-11 through 2-16 show the positions of the gears and rollers.

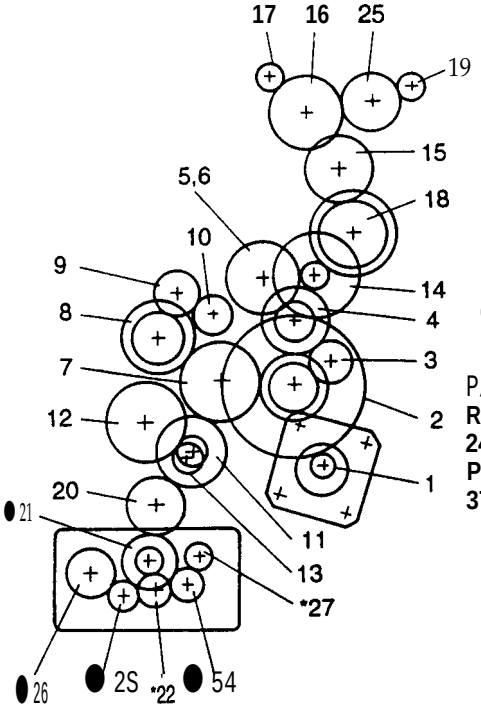


Fig. 2-11. Gear and Roiler Positions

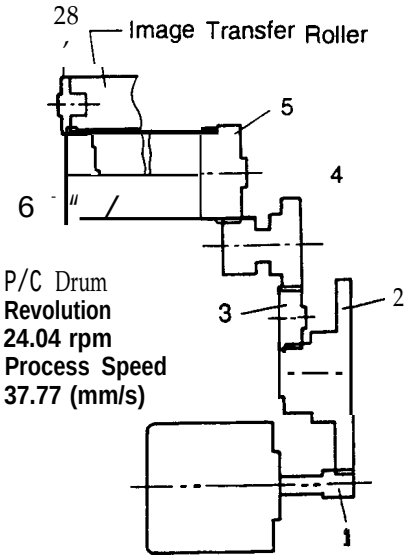


Fig. 2-12. P/C Drive Section

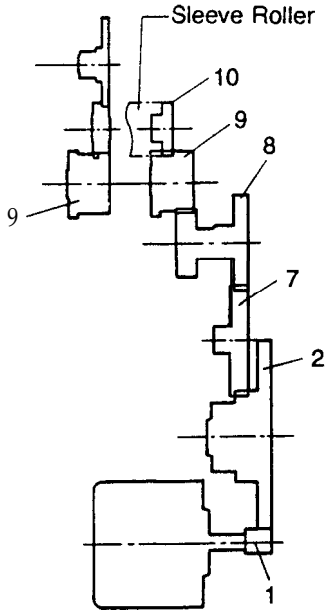


Fig. 2-13. Developing Drive Section

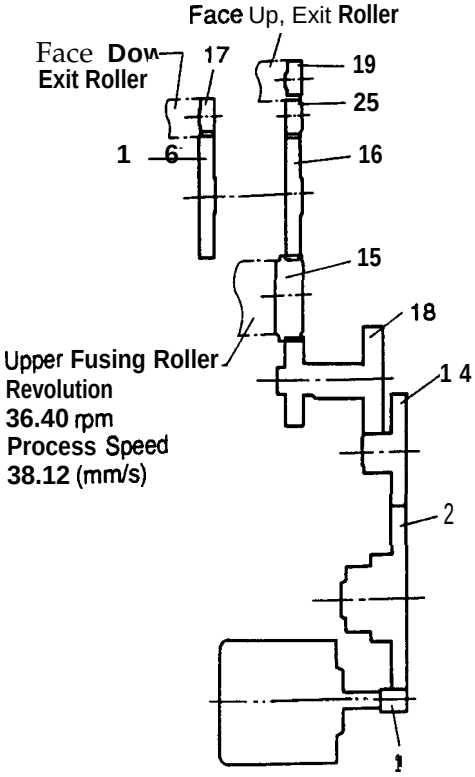


Fig. 2-14. Fusing Drive Section

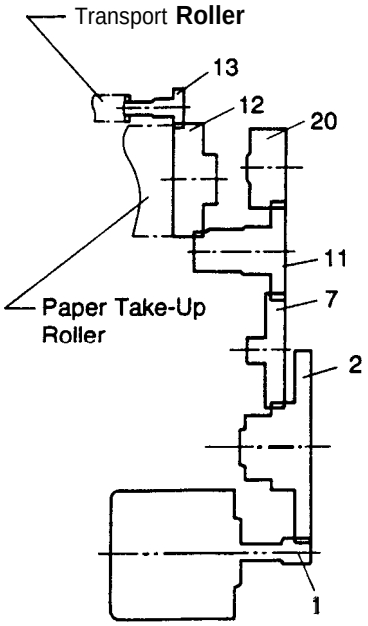


Fig. 2-15. Feeding Drive Section

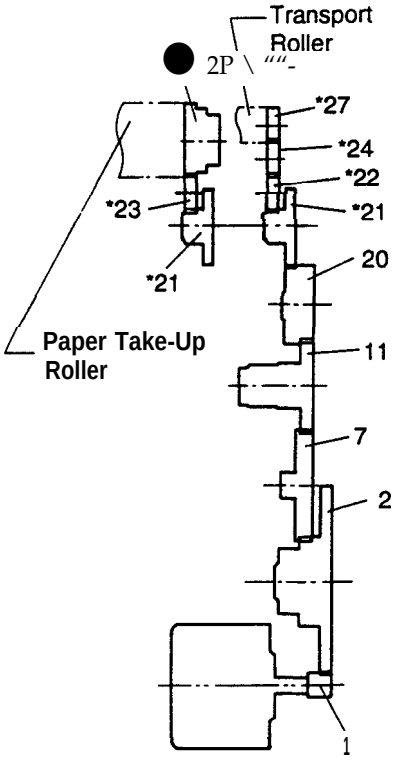


Fig. 2-16. Feeding Drive Section (Option)

Table 2-1. Gears and Rollers

No.	No. of Gear Teeth	Roller Name	No.	No. of Gear Teeth	Roller Name
1	18	Main Motor (Ml)	15	36	Upper Fusing Roller
2	28/38/126		16	54	
3	24		17	15	Face-Down Exit Roller
4	14139		18	39/48	
5	43	P/C Drum	19	15	Face-Up Exit Roller
6	30	P/C Drum	20	24/32	
7	47		21*	14/24	
8	29/41		22*	18	
9	26		23*	18	
10	23	Sleeve Roller	24*	18	
11	1 6/40		25*	16	
12	46/69	Paper Take-Up Roller	26*	16	Paper Take-up Roller
13	23	Transport Roller	27′	28	Transport Roller
14	l&75		28	14	Image Transfer Roller

*Option (lower paper cassette)

Figure 2-17 shows the main motor drive circuit. The main motor (MI) is a four-phase stepping motor. This motor is controlled by the CPU (IC1A) on the engine controller board (PWB-A). The power supply board (PWB-E) has a stepping motor driver IC. This IC drives the main motor (Ml) with a constant current. The main motor (M1) is stopped when the CPU (IC1A) on the engine controller board (PWB-A) outputs TdA and TdB signals.

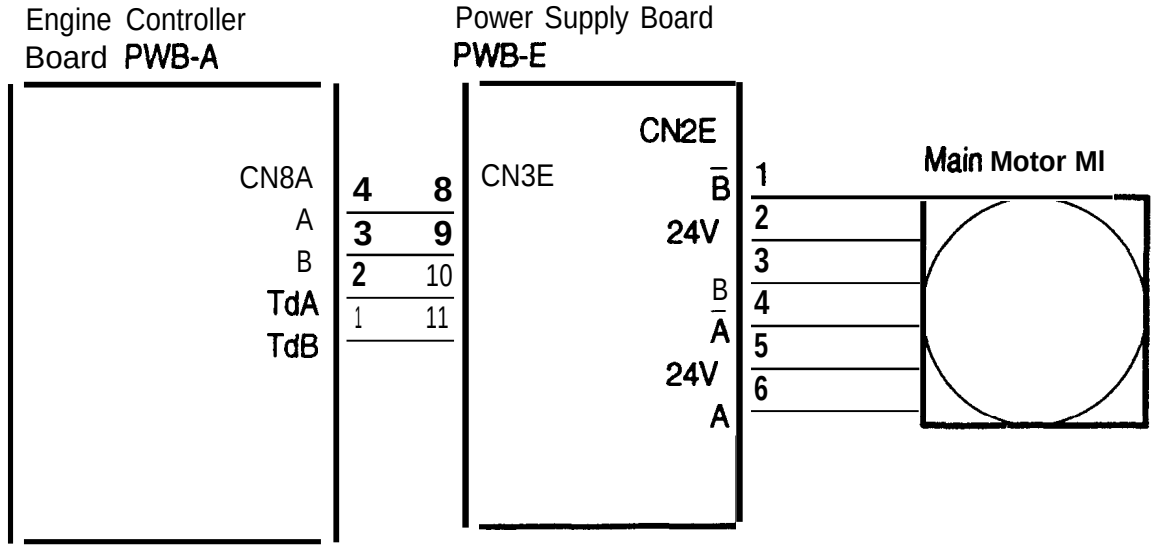


Figure 2-17. Main Motor Drive Circuit

2.1.2.2 Paper Take-Up Sensor and Paper Exit Sensor

The paper take-up sensor has three functions:

1) To detect the top edge of paper. The engine starts printing when the detection signal is received.
2) To detect paper size. The printer detects the time it takes for paper to pass the paper take-up sensor during paper feeding. If this time is long, longer paper is feeding; if the time is short, shorter paper is feeding.
3) To detect paper jams and feed jams.

If the paper take-up sensor does not turn on for paper feeding, the printer detects a feed jam. A feed jam is a paper jam that has occurred in the feed process.

If any of the following conditions is detected, the printer detects a paper jam. A paper jam is a jam that occurs in the printing process area.

- The paper take-up sensor (PC2) or the paper exit sensor (PC3) is on at power on or when the upper case is closed.
- The paper take-up sensor (PC2) or the paper exit sensor (PC3) is not turned on/off within the specified time. (Refer to the following timing chart.)

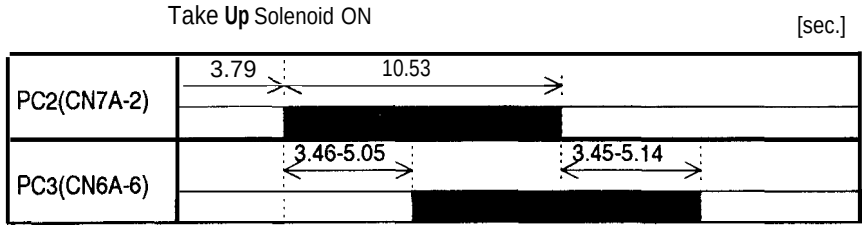


Figure 2-18. Paper Take Up Sensor and Paper Exit Sensor On/Off Timing

2.1.2.3 Fuser Control

The fuser is heated by the heater lamp, which is powered by AC voltage. When the power supply board receives a FUSER LAMP signal from the engine controller board (PWB-A), the power supply board (PWB-E) supplies the AC voltage to the heater lamp. This AC voltage is cut by the interlock switch when the case is open.

The fuser temperature is detected by the thermistor. Based on the TH1 signals from the thermistor, the engine controller board (PWB-A) controls the fusing temperature (165° C, 329" F) using the FUSER LAMP signal.

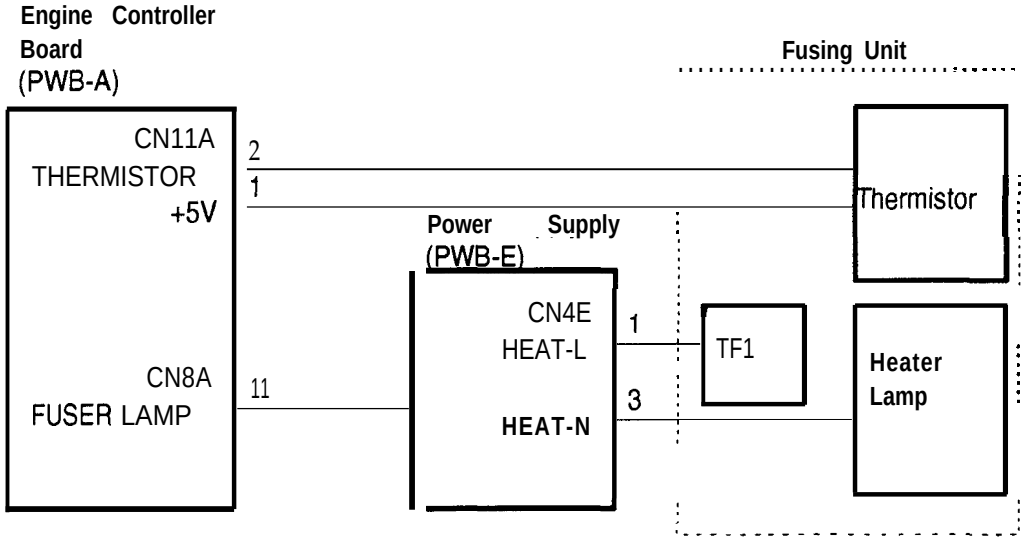


Figure 2-19. Fuser Control Circuit

The following figure shows the fuser temperature control procedure.

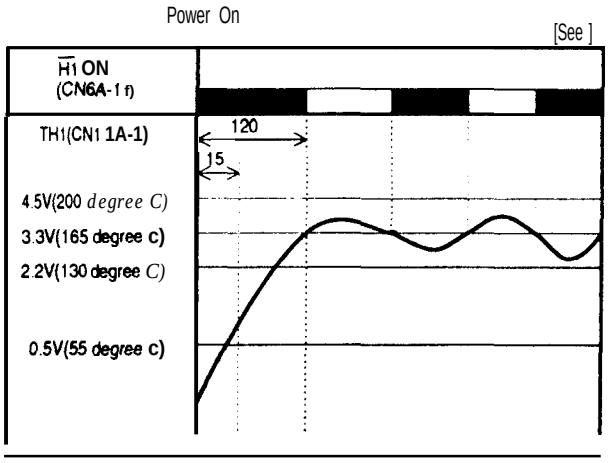


Figure 2-20. Temperature for Fuser Control Procedure

If the following conditions are detected, the printer indicates a fuser error (the LCD displays SERVICE REQ. E0003).

. The thermistor temperature does notreach55°C (131°F) within 15 sec.
- The warm-up period does notend within 120 seconds.
- The thermistor temperature drops to 130°C (266°F).
- Thethermistortemperatureexceeds 200°C (392°F).

The thermo fuse (TF1) cuts power if the temperature of the fusing section rises to an abnormally high level (over 200°C, 392°F).

2.1.2.4 Scanner Mirror Motor Control

Figure 2-21 is the scanner mirror motor (M2) control circuit. The scanner mirror motor is driven while the scanner motor receives the SCANNER MIRROR MOTOR (M2:ON) signal.

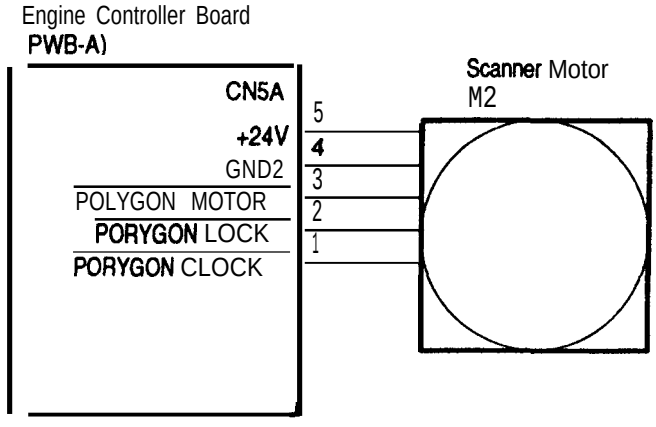


Figure 2-21. Scanner Motor Control Circuit

Figure 2-22 is the scanner mirror motor driving timing chart. The scanner mirror motor rotates 0.15 seconds after the main motor (Ml) turns on. If the MIRROR MOTOR LOCK (M2:LOCK) signal is not turned on within 3 seconds after the seamer mirror motor turns on, the printer indicates a scanner mirror motor malfunction.

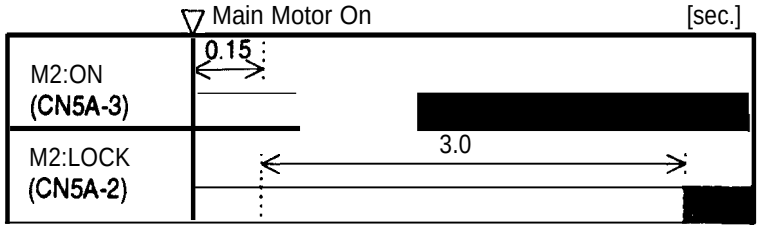


Figure 2-22. Scanner Motor Driving Start Timing

2.1.2.5 Laser Diode Drive

Figure 2-23 shows the laser diode drive circuit. Laser diode emission is controlled by three signals (L DATA, DA1, and DA2) from the engine controller board (PWB-A).

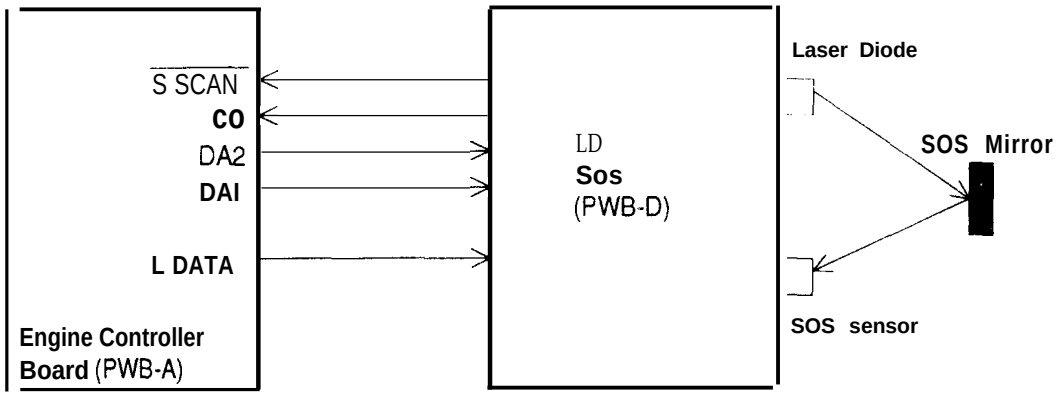


Figure 2-23. Laser Diode Drive Circuit

The L DATA signal is the laser ON/OFF signal. When it is LOW, the laser emits, and when it is HIGH, laser stops emitting. L DATA is the combination of the two signals in the figure below. If the VIDEO or the FORCED LASER DIODE ON signal is activated (LOW), the L DATA signal will be active. The VIDEO signal is an image signal sent from the video controller board (C108 MAIN board). The FORCED LASER DIODE ON signal is a laser emission signal to apply the laser beam to the SOS sensor.

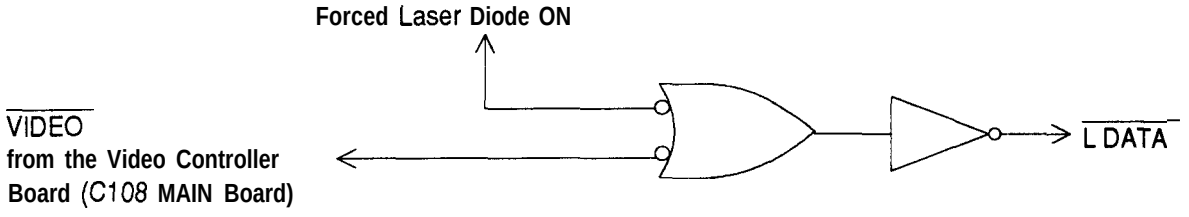


Figure 2-24. /L DATA Generation Circuit

The laser diode is forcibly activated within between **0.2** seconds and 0.1 seconds after the scanner mirror motor (M2) turns ON. At this time, laser emission power is adjusted. LDVR1 and LDVR2 are the laser emission power adjust signals; they are analog signals. LDVR1 is a tuning. LDVR2 is a fine tuning.

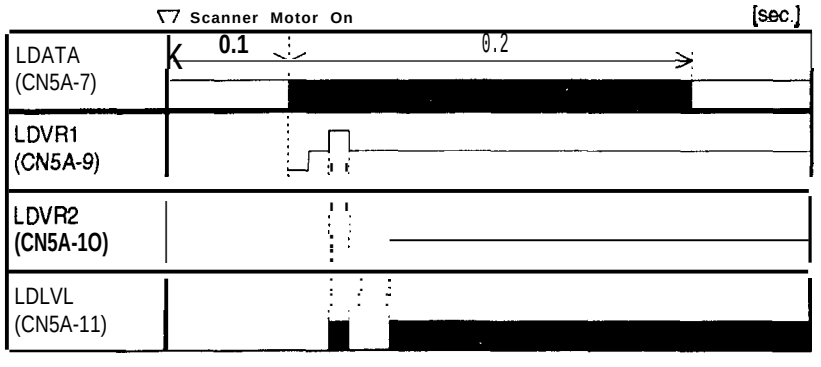


Figure 2-25. Laser Emission Power Adjustment Timing

If the $\overline{\text{SSCAN}}$ signal is not detected, the printer indicates a laser diode malfunction. If the scanner mirror motor (M2) does not rotate, the printer also indicates a laser diode malfunction.

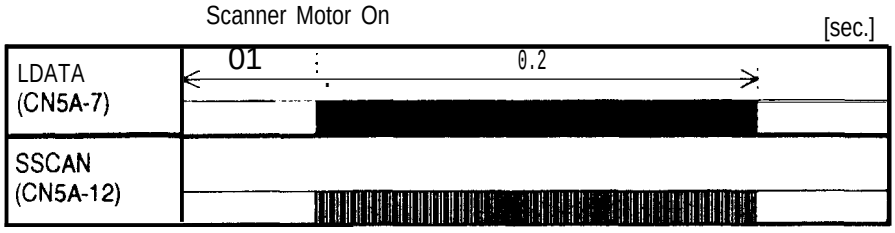


Figure 2-26. Laser Diode Error Detection

2.1.2.6 Bias Voltages and Laser Drive Timing

Figure 2-27 is a diagram of the drum charge bias voltage, image transfer bias voltage, doctor blade bias voltage, and the developing bias voltage control circuit. These bias voltages are generated from the +24 VDC from the high voltage supply board (PWB-F). If the printer detects a case open condition, the interlock switch is set to OFF, which cuts the +24 VDC, which, in turn, cuts the bias voltages.

These bias voltages are controlled by the engine controller board (PWB-A). The $\overline{\text{CH2:ON}}$ (I-IV-T) signal is the image transfer (roller) bias voltage control. While this signal is LOW, the image transfer roller is charged to 3.2K VDC by the high voltage supply circuit. And while this signal is HIGH, the image transfer roller is charged to –0.8K VDC. The $\overline{\text{CH1:ON}}$ (HV-C/T.R) signal controls the drum charge. While this signal is LOW, the PC drum is charged to –1.2K VDC.

The DB:CNT ($\overline{\text{HV-B.VR}}$) signal is an analog signal for developing bias voltage control. This signal controls the bias voltage level (–300V to –375K VDC) using analog data. The image density is controlled by the developing bias voltage level.

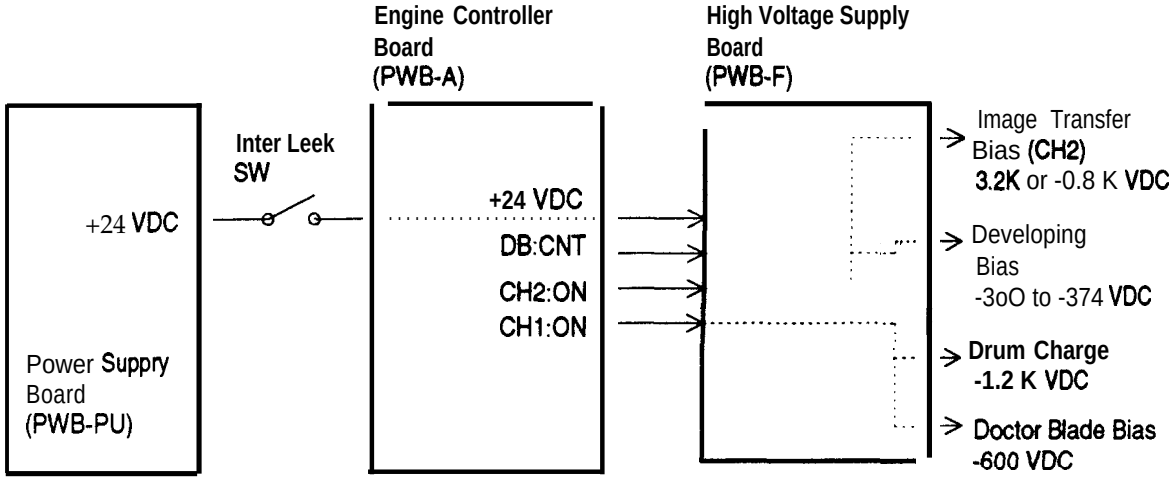


Figure 2-27. High Voltage Supply Block Diagram

Figure 2-28 is the print process, and Figure 2-29 is the power on sequence. During the power on sequence (initialization), the printer detects mechanical errors.

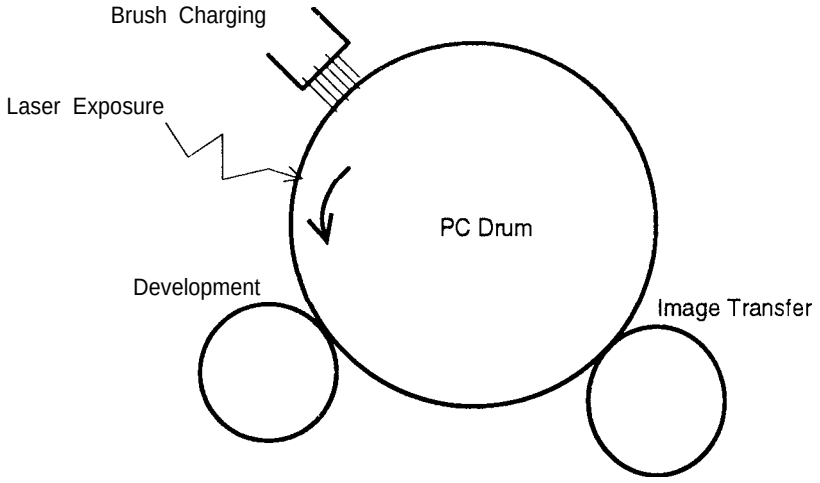


Figure 2-28. Print Process

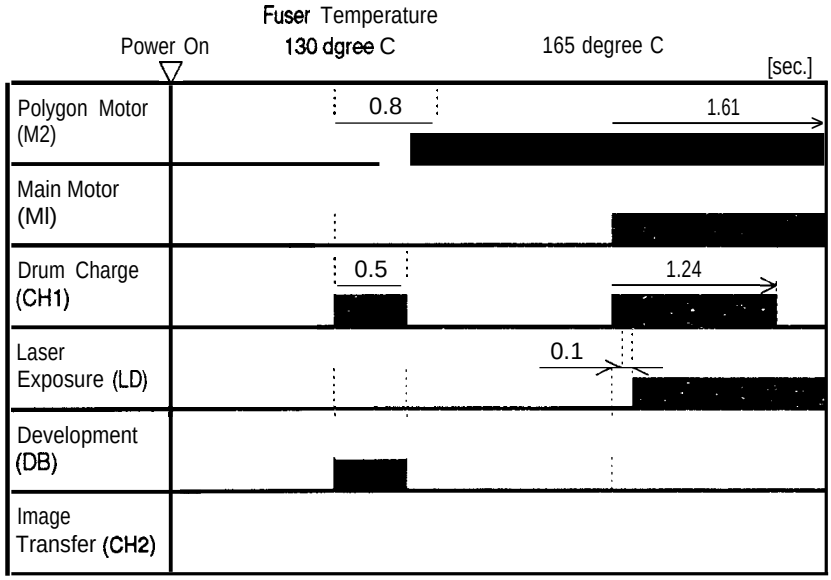


Figure 2-29. Power On Sequence

Figure 2-30 is the start print sequence. The printer's engine starts printing when the $\overline{\text{PRINT}}$ signal is received from the video controller board.

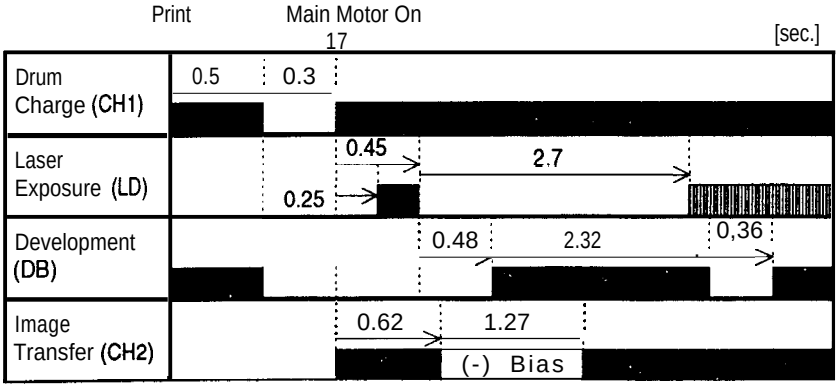


Figure 2-30. Print Sequence (Start)

Figure 2-31 is the end of the print sequence. The printer stops the main motor (Ml) from rotatin& when the paper exit sensor turns off after 2.53 seconds.

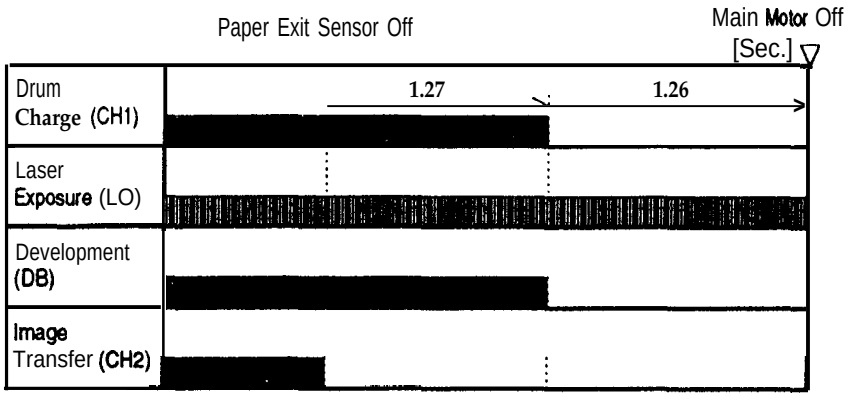


Figure 2-31. Print Sequence (End)

2.1.2.7 Fan Motor Control

The fan motor (M3) rotates at all *times* after initialization of the engine has beerr completed. The fan motor rotates faster during printing. When printing ends, the fan motor slows down after 15 seconds.

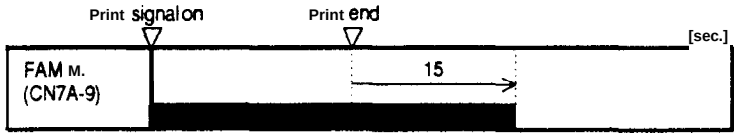


Figure 2-32. Fan Motor Speed Control Timing

If the voltage of pin IC1A-64 on the engine controller board (PWB-A) does not exceed 150mV for 1 second, the printer indicates a fan motor malfunction.

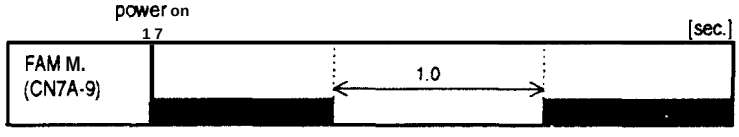


Figure 2-33. Fan Motor Malfunction Search Timing

2.1.2.8 Power Supply Circuit Function and Safety Protection

The printer's power supply board (PWB-E) supplies the +5 VDC and +24 VDC. The +24 VDC is used as the bias voltage supply, main motor (Ml) drive, seamer mirror motor (M2) drive, fan motor (M3) drive, and solenoid drive. For safety protection, the +24 VDC line is cut when the interlock switch (case open switch) is off.

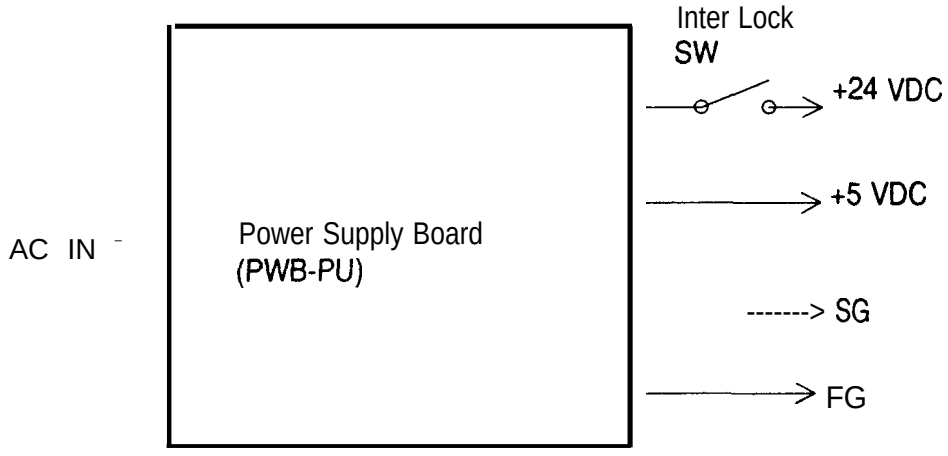


Figure 2-34. Power Supply Circuit Block Diagram

2.2 VIDEO CONTROLLER OPERATION

The video controller section generates the video signals for the received data. The video controller section is separate in the C108 MAIN board, the C82907* ROM-B board (if installed), and the control panel. The control panel is connected to the engine controller board (PWB-A), but is controlled by the C108 MAIN board, which sends the signals for the control panel through the engine controller board.

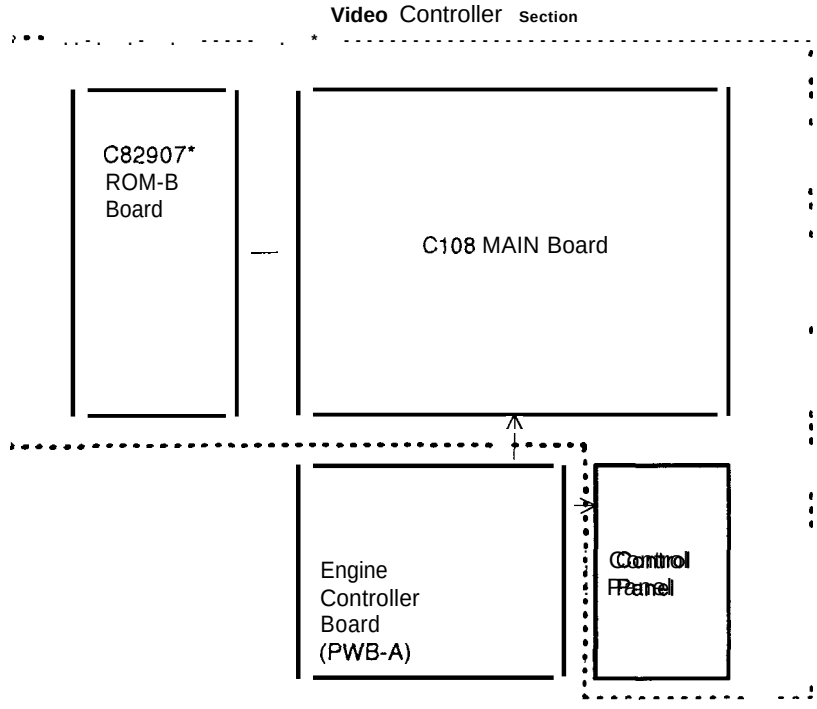


Figure 2-35. Video Controller Section

2.2.1 C108 MAIN Board Operation

Figure 2-36 shows a block diagram of the C108 MAIN board. The C108 MAIN board contains the video controller, which consists of a 16-bit 68000 (16.67 MHz) CPU, the standard cells developed for this printer, DRAMs, ROM, and a 16K-bit EEPROM.

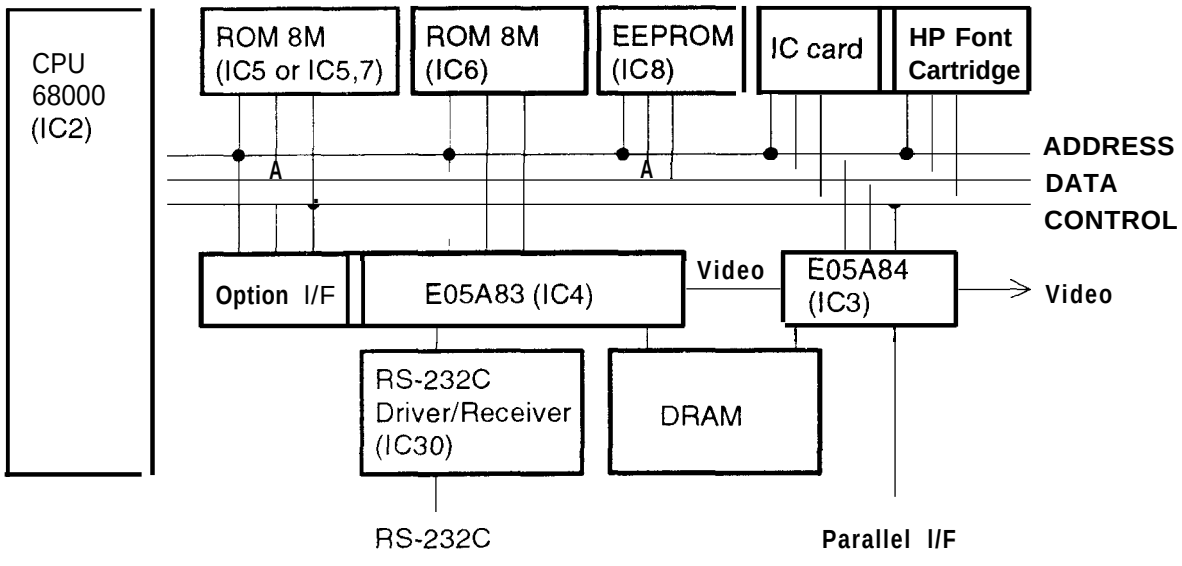


Figure 2-36. C108 MAIN Board Block Diagram

Table 2-2 lists the functions of the C108 MAIN board main elements.

Table 2-2. Functions of C108 MAIN Board Main Elements

Element	Location	Function
68000 CPU	IC2	The CPU, which operates at 16.67 MHz, manages the video controller operation.
E05A83 standard cell	IC4	This standard-cell contains the following functions: .Interrupt control • Address decoding . Clock control .DRAM management (refresh control, RAS/CAS control) .Image processing .RS-232C interface .Control panel control • Video interface
:e~A84'tandard	IC3	This standard-cell contains the following functions: .Parallel interface .DRAM management, with the E05A83 .Video signal switching
An 8M ROM or two 4M ROMs	IC5 or IC5, IC7	This ROM stores the following: .Basic Operating program . HP emulation mode program .LQ/FX emulation mode program .Bit map fonts (the EPL-5000/5200 has only one 8M ROM.)
8M ROM	IC6	This ROM is the GQ chip option (GQ mode program and GQ fonts) or the local language ROM (fonts) option (except in ActionLaser 1000/1500).
EEPROM	IC8	This EEPROM stores the following: .Model type .Printed page counter value .Toner life counter value .SelecType setting
DRAM	IC9, 31,32, 33,34, 10, 11, 12, 13, 17, 16, 15, 14	The EPL-5000/ActionLaser 1000's standard DRAM is IC9 (0.5MB) only; other DRAMs are options. The EPL-520W ActionLaser 1500's standard DRAMs are IC9, 31,32,33, and 34(1 .0MB total) only; other DRAMs are options. These DRAMs are used as the working area of the CPU: input buffer, image buffer, etc.
RS-232C driver/receiver MAX238	IC30	This IC changes the RS-232C signal level. (The ActionLaser 1000 does not have this IC.)

Print data and commands transmitted from the host computer via parallel, serial, or optional interfaces are read using the interrupt process of the CPU and stored in the DRAM input buffer. The capacity of the input buffer can be specified by SelecType setting. A larger input buffer improves the throughput.

Data and commands in the input buffer are processed by the CPU, which then stores the printing bit map data (image data) in the V (video) -RAM (image buffer) in the DRAM. The size of the V-RAM depends on the available DRAM size, and can be specified using SelecType. A page error occurs when the V-RAM is so small that the CPU cannot process data faster than it is transmitted to the engine controller board. If such an error occurs, increase the V-RAM using SelecType.

The CPU transmits image data stored in the V-RAM in a temporary buffer in the SRAM, which is located in an address space different from the CPU. The temporary buffer has a capacity equivalent to several lines. This is controlled by the standard cell, which synchronizes and transmits the temporary buffer's data to the engine controller board.

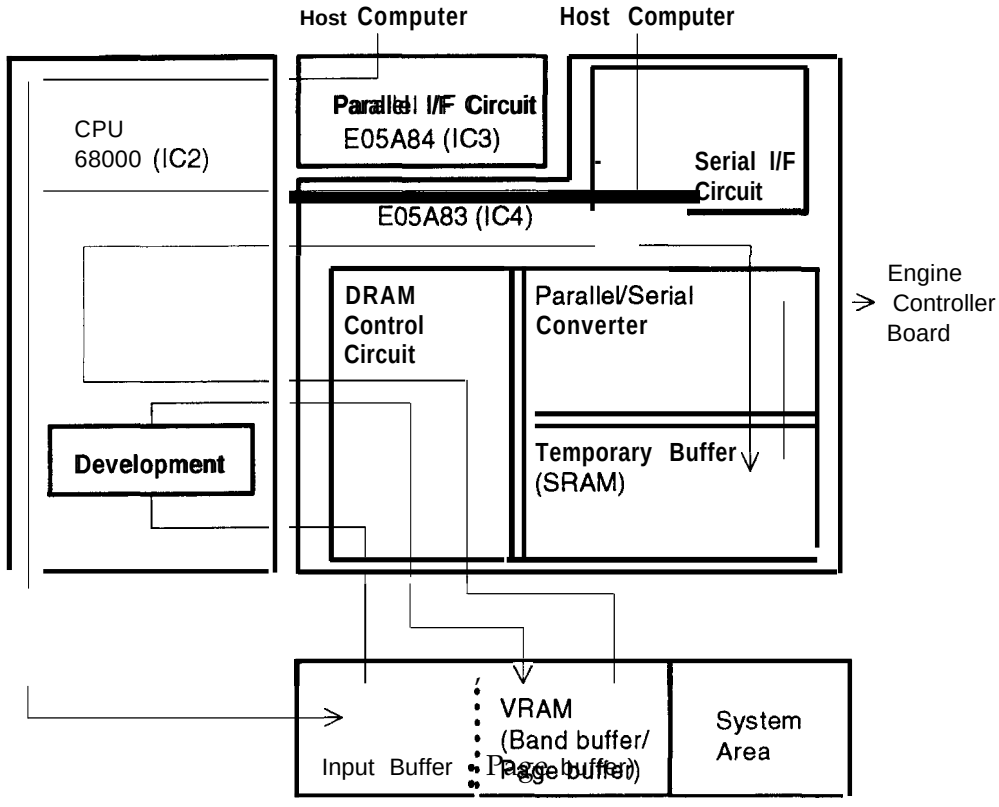


Figure 2-37. Data Flow Diagram

2.2.1.1 Reset Circuit

The 68000 CPU contains the reset terminal, which is bidirectional and can initialize the system either from inside or outside the CPU. The entire system (the CPU and the external devices) can be initialized if both the HALT (CPU pin 20) signal and the RESET signal (CPU pin 21) are active simultaneously. By executing a RESET **instruction, a** RESET pulse from inside the CPU can also be **issued to** reset all the devices **connected** to the RESET line. This circuit uses an M51954A **IC** to monitor the supply voltage and reset the CPU if a voltage level less than 4.25 V is detected. The reset time is approximately 840 ms.

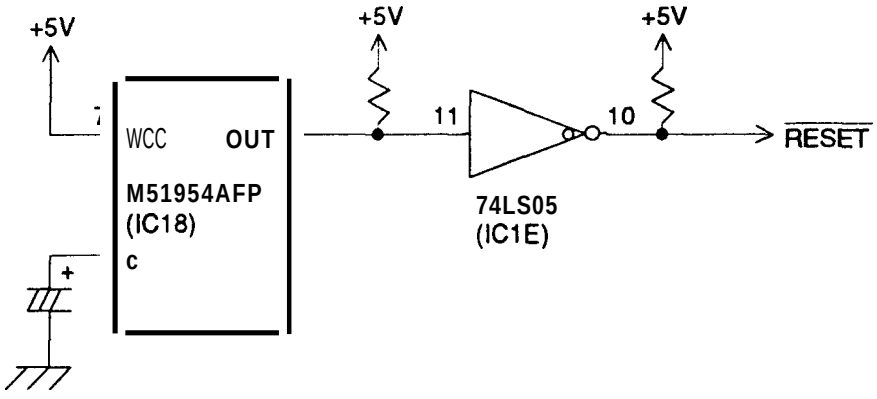


Figure 2-38. Reset Circuit

2.2.1.2 Bus Control Circuit

The 68000 CPU outputs the R/W (read/write) signal, AS (address strobe) signal, and the FCO, **FC1,** and FC2, signals (processor status) to the **E05A83** standard **cell.** The **E05A83** standard **cell** uses these signals to generate the RD (read strobe) signal, **DTACK** (wait control) signal, **VPA** (interrupt **control) signal, and BERR** (bus error) signal.

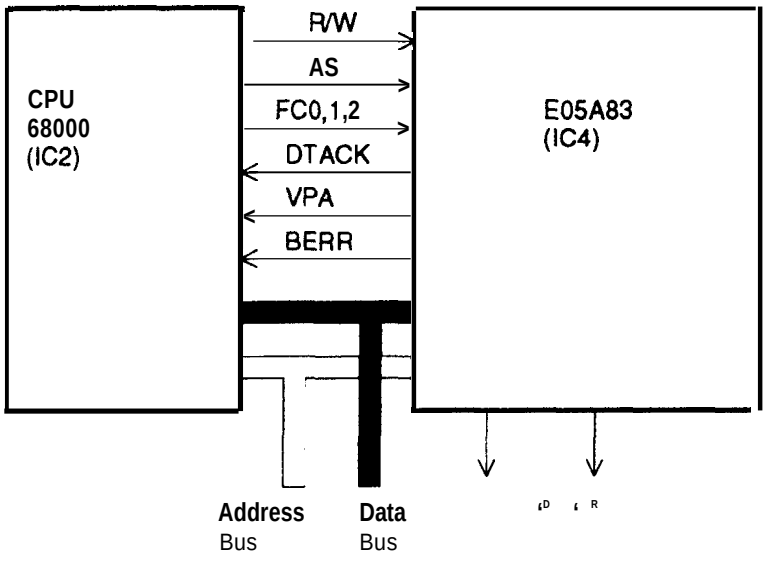


Figure 2-39. Bus Control Circuit

2.2.1.3 Interrupt Control

The E05A83 standard cell determines the priority level of the interrupt and outputs it to terminals IPL0 - IPL2. Then an interrupt is sent to the CPU. If the CPU accepts the interrupt, terminals FC0 - FC2 all go HIGH to indicate the interrupt acceptance to the E05A83 standard cell. The E05A83 standard cell confirms that terminals FC0 - FC2 are HIGH (interrupt acknowledge), and then sets the VPA terminal to LOW and informs the CPU that this is an automatic vector interrupt. This initializes the interrupt process. The E05A83 standard cell has a controller for the automatic vector interrupt.

2.2.1.4 DRAM Management

The video controller uses DRAMs for the system RAM and for the V-RAM.

In the EPL-5000/ActionLaser 1000, a standard 256K x 16 DRAM is mounted in location IC9, providing a total of 0.5MB. IC sockets IC31, 32, 33, 34, 10, 11, 12, 13, 17, 16, 15, 14 are optional DRAM sockets. These IC sockets can use 64K x 4-bit DRAMs or 256K x 4-bit DRAMs.

In the EPL-5200/ActionLaser 1500, a standard 256K x 16-bit DRAM and four 64K x 4-bit DRAMs are mounted in locations IC9, 31,32,33,34, which provide a total of 1.0MB. The IC sockets IC1O, 11, 12, 13, 17, 16, 15, 14 are optional DRAM sockets. These IC sockets can use 64K x 4-bit DRAMs or 256K x 4-bit DRAMs.

The DRAMs (including optional chips) are managed by the E05A83 and E05A84 standard cells. The E05A83 standard cell handles the main management. The E05A83 outputs RAS/CAS, WE, and OE signals. The IC9 DRAM is controlled directly by the E05A83. Other DRAMs (including optional chips) are controlled by the CAS, WE, and OE signals from the E05A83, and also controlled bv the RAS signal from the E05A84. The E05A84 changes the RAS output timing according to DRAM size (64K × 4-bit DRAM or256K x4-bit DRAM).

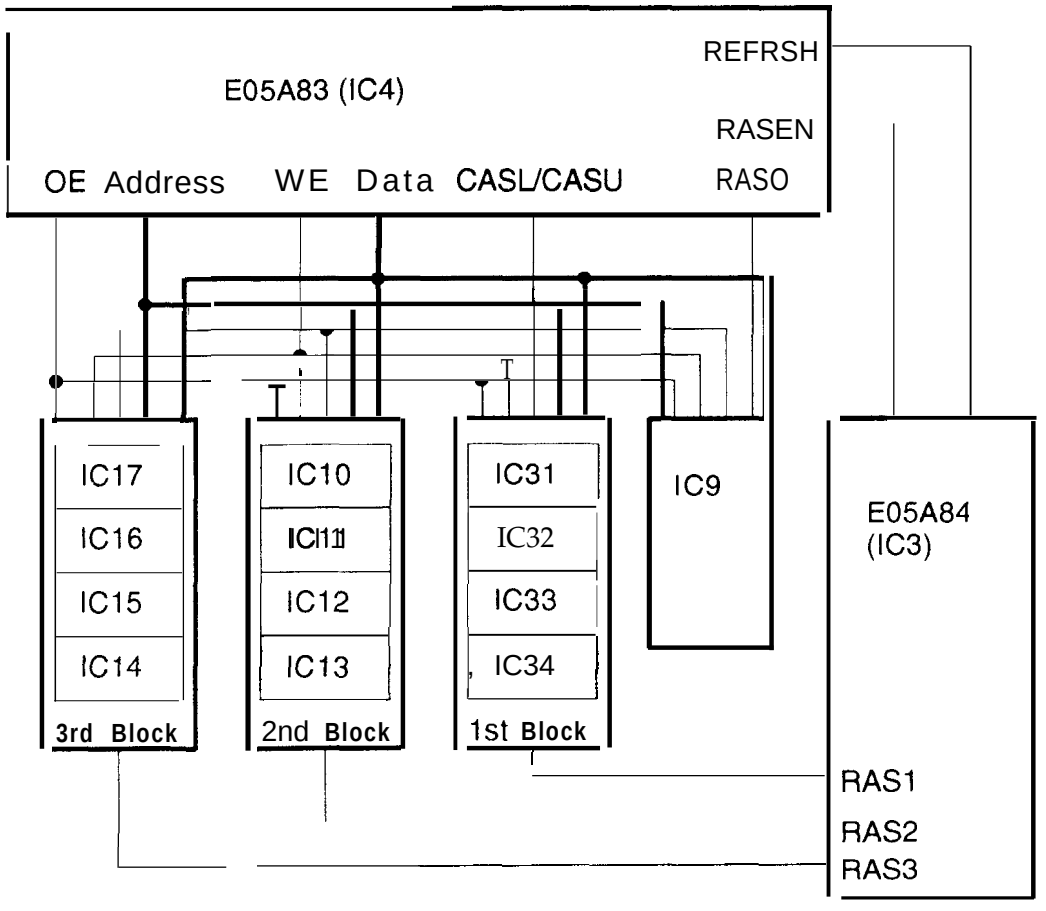


Figure 2-40. DRAM Management

2.2.1.5 Parallel Interface Circuit

Figure 2-41 shows the parallel interface circuit block diagram. Data sent from the host computer is latched within the E05A84 by the STROBE signal. The E05A84 outputs the BUSY signal automatically to stop the host computer from sending additional data. The CPU resets the BUSY signal after reading the data from the E05A84, so that the printer is ready to receive more data from the host computer.

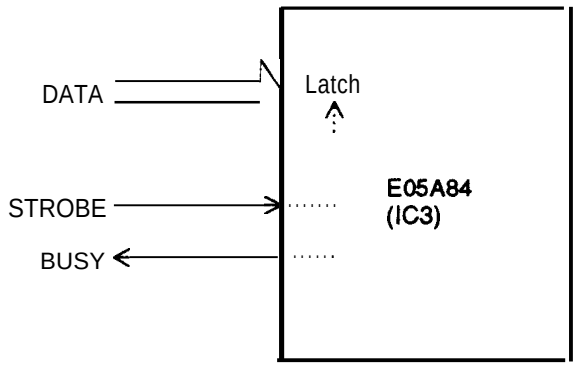


Figure 2-41. Parallel Interface Circuit

2.2.1.6 RS-232C Circuit

This circuit uses the RS-232C receiver/driver IC MAX238 (IC30) to change the signal level from the RS-232C signal level (-12 VDC or +12 VDC) to the TTL signal level (O V or +5 V) or from the TTL signal level to the RS-232C signal level. This IC converts +5 VDC to +12 VDC and -12 VDC.

The E05A83 standard cell changes serial (RS-232C) data to parallel data. Since the ActionLaser 1000 does not have an RS-232C connector, the CPU must check the model type for an RS-232C interface at initialization. In a printer with an RS-232C interface, the R4IN terminal (pin 16) for the MAX238 is pulled up to +5 VDC. The CPU checks the R4OUT terminal (pin 30) for MAX238 at initialization. If the R4OUT terminal is LOW, the CPU assumes that the printer is a model with no RS-232C. The model with no built-in RS-232C (the ActionLaser 1000) can use a non-intelligent optional serial interface (model C82305*/C82306*). This optional interface also uses the E05A83 standard cell as the circuit to change serial data to parallel.

The models with a built-in serial interface (the EPL-5000/5200 and ActionLaser 1500) cannot use the non-intelligent optional serial interface (model C82305*/C82306*).

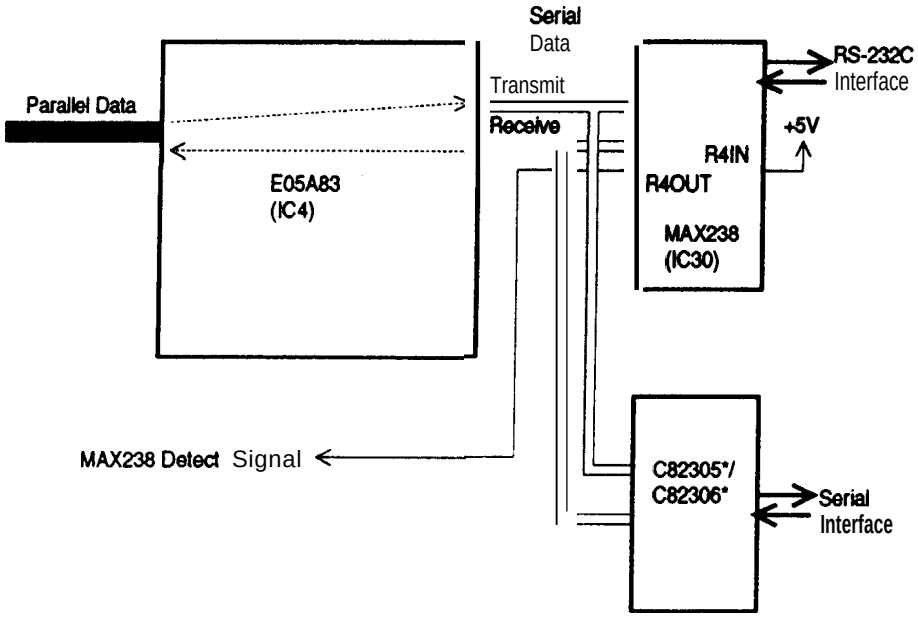


Figure 2-42. RS-232C Circuit

2.2.1.7 Optional Type-B Interface

This printer supports an Epson Type-B optional interface, which is controlled by the INH and BIF signals from the E05A83 standard cell.

2.2.1.8 Video Interface

The E05A83 standard cell **maps the SRAM into a memory space different from the system memory. The** CPU transmits data from the V-RAM (in the system RAM) to the SRAM using the E05A83 standard cell. The standard cell **converts the image data in the SRAM** from parallel to serial, synchronizes it, and then transmits it to the engine controller board. In other words, the SRAM is a temporary buffer used to transmit the image data to the engine controller board. This serial image data is called the VIDEO signal of video interface.

The signal line of the internal video interface circuit (the C108 MAIN board and engine controller board) can be broadly divided into four groups. The first group (PRINT, CPRDY, EPRDY, and PRDY) gives the status of either the video controller **or engine controller and indicates whether they are ready to communicate with each other or ready to start the printing operation. The second group (VSYNC)** is the synchronizing signal for the printing operation. The third group (VIDEO) is the serial video data signal. The fourth group (CMD, SRCLK, CTBSY, and ETBSY) is used to transfer the coremands (from the video controller) or the status (from the engine controller) for printer mechanism control.

This printer has RITech function optionally (EPL-5000/ActionLaser 1000) or standard (EPL-5200/ ActionLaser 1500). This function modifies the VIDEO signal with the E05A74 gate array on the C82907* ROM-B board. If the C82907* ROM-B board is installed, the VIDEO signal travels through the C82907* ROM-B board to engine controller board.

2.2.2 C82907* ROM-B Board Operation

The C82907* ROM-B board has two functions: HP PCL/5 emulation and the RITech function. The ROM stores the PCL/5 (EPSON GL/2) commands and fonts. The RITech function modifies the VIDEO signal to smooth printed edges.

Table 2-3 lists the functions of the main elements of the C82907* ROM-B board.

Table 2-3. Functions of C82907* ROM-B Board

Element	Location	Function
E05A74	IC1	RITech IC
64K SRAM	IC2	Working area for E05A74
8M or two 4M ROM	IC3 or IC6, IC7	This ROM stores the following: ● PCU5 (EPSON GL/2) mode •Scalable fonts for PCL/5 •Bit map fonts (Landscape)

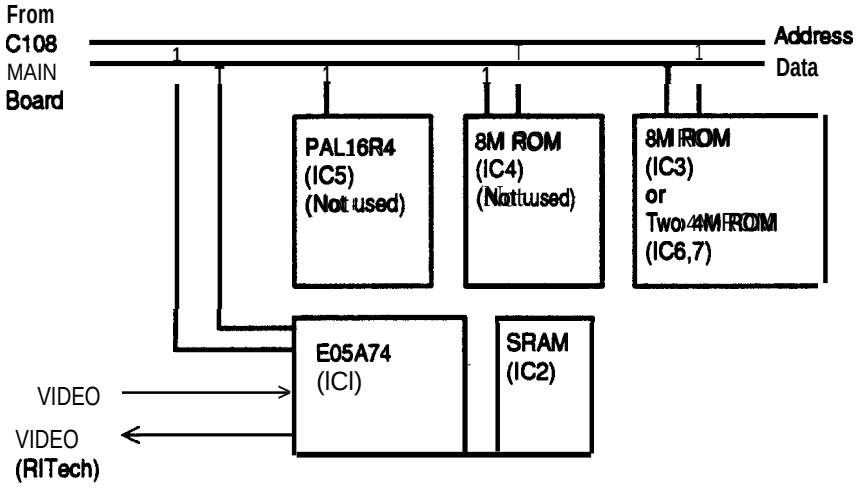


Figure 2-43. C82907* ROM-B Board Block Diagram

Chapter 3 Disassembly and Assembly

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3.1 GENERAL INFORMATION

This chapter describes the disassembly/assembly procedures to be used for replacing the main assemblies of the EPL-5000/5200 and ActionLaser 1000/1500.

3.1.1 Precautions for Disassembly/Assembly

Follow the precautions below when disassembling/assembling the printer.

WARNING

- *Disconnect the power cord before **disassembly/assembly** the **printer.***
- *Be sure to handle **the fusing** unit **carefully,** because* the ***unit** is still hot for a while **after** the **printer** stops printing.*
- ***If** it is necessary to plug in the power cord and operate the **printer after** disassembling it, please be **careful** of the **following:***

  *1) Keep your hands and clothing well **away from** operating or rotating parts (such as rollers, fan motors, etc.).*

  2) Never touch electric terminals or high-voltage components (such as the charger and the high-voltage unit).

CAUTION

- *Do not disassemble the **imaging cartridge.***
- *If the **imaging cartridge** is **removed from** the **printer,** do not place it in the direct sunlight.*
- *Do not disassemble the printhead unit.*
- *Never turn power on if the **printhead** unit is not installed.*
- *To prevent damage to **ICs from** static **electricity,** do not touch the **ICs** on the circuit board or the terminals of **peripheral** electrical components **with** your hands.*
- *Use only the recommended tools* to *ensure safe and **efficient** maintenance work. **Inappropriate** tools may damage the machine.*
- *Never open the upper unit until the main motor stops completely. **Otherwise,** the gears may be damaged*
- *When transporting the **printer,** remove the **imaging cartridge** from the **printer.***
- *When transporting the **printer** a long distance, box **the printer** using the **original packing material.***

3.1.2 Tools

Use the tools listed in Table 3-1 for disassembly/assembly and troubleshooting.

Table 3-1. Tools

Name	Commercially Available?	Part No.
Phillips screwdriver No. 2	Yes	B743800200
Regular screwdriver	Yes	B743000100
Tweezers	Yes	B641000100
Soldering iron	Yes	B7402O01OO
Round-nose pliers	Yes	B7404O01OO

3.1.3 Small Parts

In the following sections, abbreviations are used for small parts, such as screws and washers. Tables 3-2 and 3-3 list these abbreviations.

Table 3-2. Abbreviations Used for Screws

Abbreviation	Part Name
CP screw	Cross-recessed Pan head
CC screw	Cross-recessed Cup head
CP(O) Screw	Cross-recessed Pan head with Outside toothed took washer
CP(S)(P1) screw	Cross-recessed Pan head with Spring lock washer and 1 Plain washer
CCB screw	Cross-recessed Cup head Bind
SCB screw	Slotted Cross-recessed B-tite
SCB(S)(P1) screw	Slotted Cross-recessed Bind with Spring washer and 1 Plain washer

Table 3-3. Screw Types and Abbreviations

Head		Body	Washer (assembled)
Top	Side		
1. Gross-recessed head	1. Bind	1. Normal	1. Plain washer 1
2. Slotted Cross-recessed head	2. Pan	2. B-tight	2. Outside toothed lock washer
	3. Cup		3. Spring washer

3.1.4 Service Checks after Repair

Check the repaired unit using the following list on completion of servicing.

Table 3-4. Checks after Repair

Item	Location	Check Point	Check
Operation	Control panel	Do all LEDs, LCD, and buttons function normally?	
	Heater lamp	Does the heater lamp turn ON normally?	
	Testprint (status sheet, font sample, feature print)	Is the test print performed normally?	
	HP font cartridge and font IC card slot	Does fonts for cartridge or IC card print on font sample Printing?	
	Data print	Does data print in all modes?	
Adjustment	Print position	Is the gap between the top edge of the paper and the horizontal line in the feature print exactly 32.4 mm (EPL-5000 or ActionLaser 1000) or 33.5 mm (EPL-5200 or ActionLaser 1500)?	
ROM version		IS it the latest version?	
Cleaning		Is toner and dust removed from the paper path? Is the tens on the printhead unit cleaned? Is the paper take up roller cleaned? Is the roller in the fusing unit cleaned? Is the outer surface of the printer clean?	
Packing		Is the imaging cartridge removed from the printer? Is the unit packed securely? Are accessories packed also?	

3.2 DISASSEMBLY AND ASSEMBLY

This section describes and illustrates the procedures for removing and disassembling the components of the EPL-5000/5200 and ActionLaser 1000/1500. Cleaning is described in Chapter 6. The assembly procedures are not described, except for special notes where necessary, because assembly can be accomplished by performing disassembly in reverse.

3.2.1 Removal of the Video Controller Section

The control section is comprised of the video controller board (the C108 MAIN board), the PCL5/RITech upgrade board (C82907* ROM-B board), and the control panel board.

3.2.1.1 Video Controller Board (C108 MAIN) Removal

CAUTION

Before you remove the video controller board, make sure that you remove any optional cards or cartridges. Otherwise, you may damage the cartridge or card connectors on the board as well as the cartridge or card itself.

1. Turn the printer so that its left side faces you.
2. Remove the 2 SCB screws (M3 x 14) securing the interface card cover; then pull off the cover.
3. Remove the 3 SCB(S)(P1) screws (M3 x 6) that secure the metal bracket on the left side of the printer.

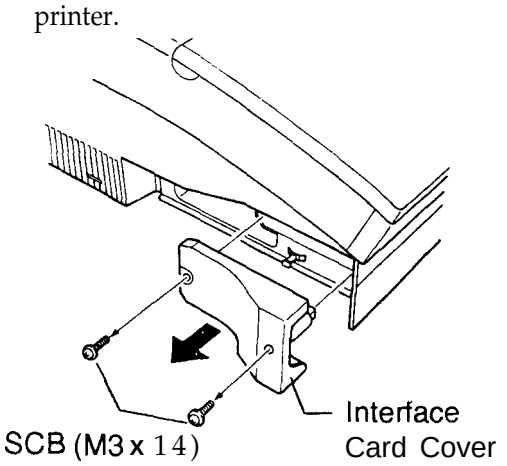


Figure 3-1. Removing the Interface Cover

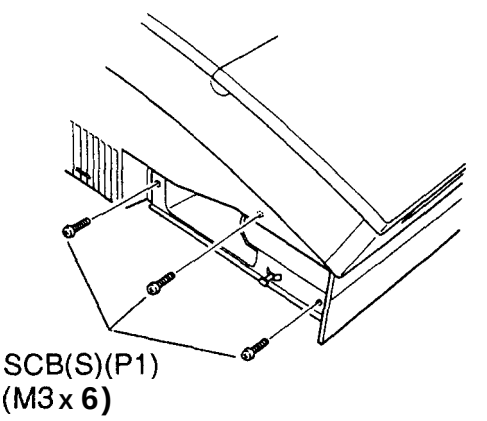


Figure 3-2. Removing the 3 Screws

4. Pull the tab on the bottom of the bracket to release the video controller board, as shown below.
5. Grasp the board with both hands and pull it out of its slot.

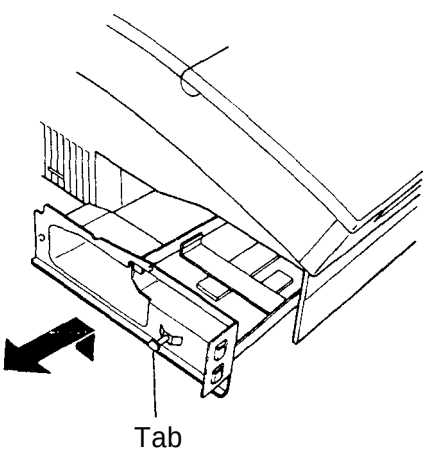


Figure 3-3. Pulling the Tab

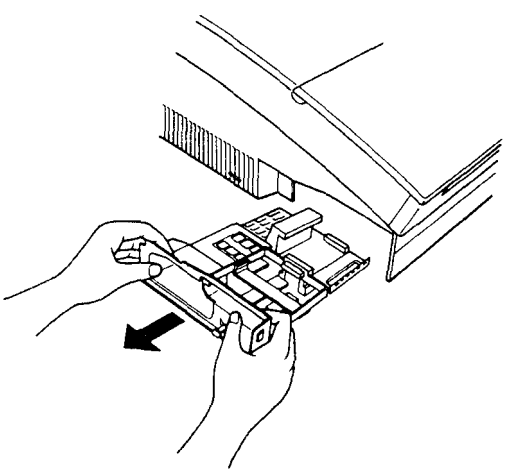
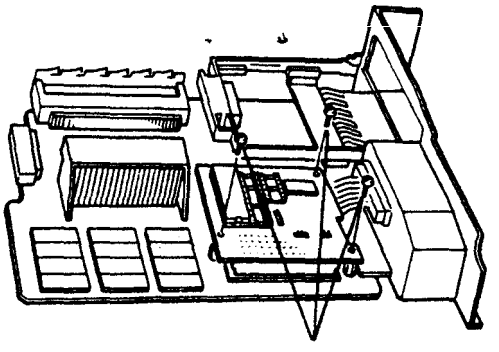


Figure 3-4. Removing the Video Controller Board

3.2.1.2 PCL5/RITech Upgrade Board (C82907* ROM-B) Removal

1. Remove the video controller board (C108 MAIN board). (Refer to Section 3.2.1.1.)
2. Remove3CP screws (M3 x 5) from the PCL5/RITech upgrade board.
3. Remove the PCL5/RITech upgrade board from the video controller board (C108 MAIN board).



CP (M3 x 5)

Figure 3-5. Removing the 3 Screws

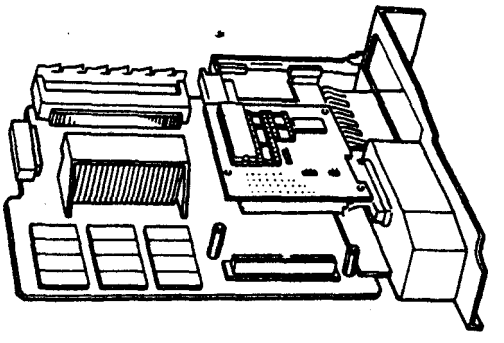


Figure 3-6. Removing the PCL5/RITech Upgrade Board

3.2.1.3 Control Panel Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove 1 CC screw (M3 x 8) from the control panel.
3. Lift the control panel, and then remove connector CN3 on the engine controller board (PWB-A).
4. Remove the control panel.

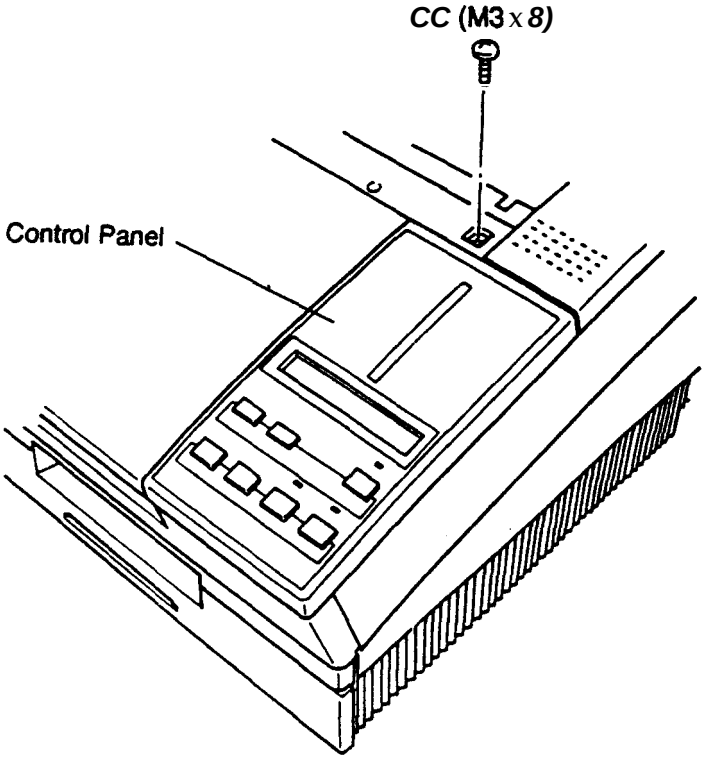


Figure 3-7. Removing the Control Panel

3.2.2 Housing Removal

This section describes how to remove the cases and the rear frame.

3.2.2.1 Case Removal

1. Remove the video controller board (C108 MAIN board). (Refer to Section 3.2.1.1.)
2. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
3. Remove the control panel. (Refer to Section 3.2.1.3.)
4. Remove the paper cover.
5. Remove 3 CC screws (M3 x 8) for the paper guide case, and remove the paper guide case.
6. Loosen 2 CC screws (M3 x 8) and the front cover.
7. Remove 1 CCB screw (M3 x 8) and 2 CC screws (M3 x 8), and remove the right cover.
8. Remove 3 CC screws (M3 x 8) and left cover.
9. Remove the top cover.

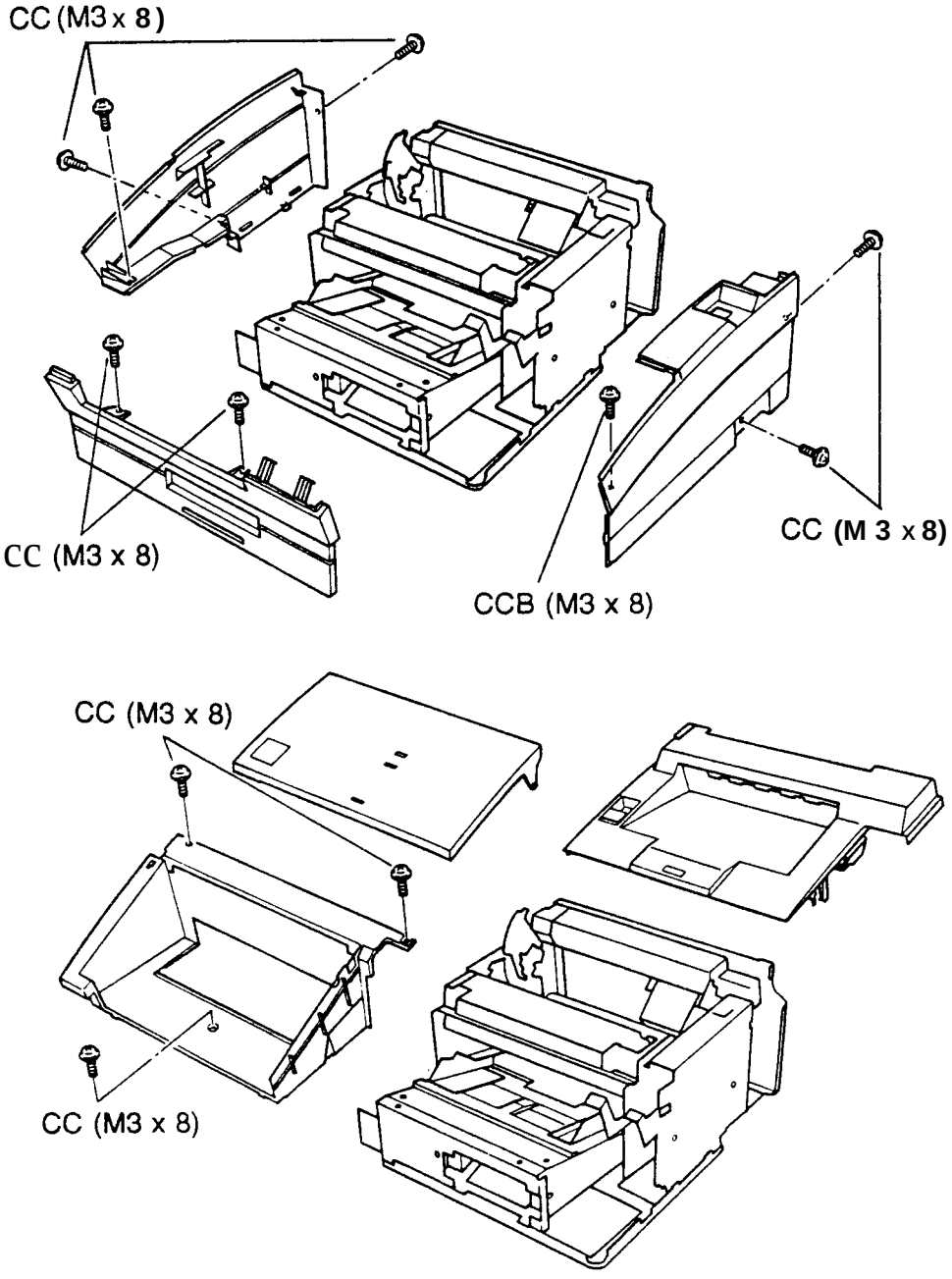


Figure 3-8. Removing the Housing

3.2.2.2 Rear Frame Removal

1. Remove the video controller board (C108 MAIN board). (Refer to Section 3.2.1.1.)
2. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
3. Remove the control panel. (Refer to Section 3.2.13.)
4. Remove the paper cover.
5. Remove therightcoverand left cover. (Refer to Section 3.2.2.)
6. Remove the top cover.
7. Remove 6 CP(O) screws (M3 x 6) and lift the rear frame.
8. Discomect comector CN1 on the power supply board (PWB-E) and connector CN2 on the high voltage supply board (PWB-F).

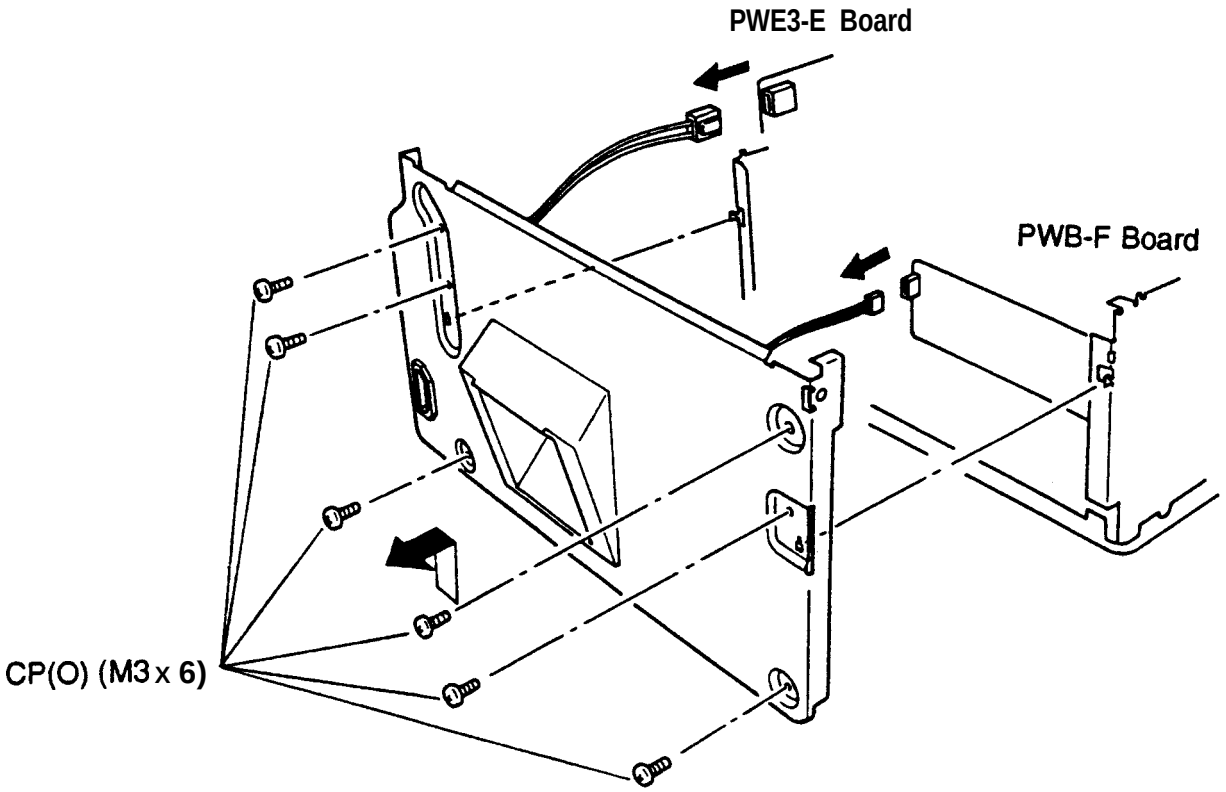


Figure 3-9. Removing the Rear Frame

3.2.3 Disassembling the Engine

This section describes disassembling the engine, including the engine controller board (PWB-A) and power supply board (PWB-E).

3.2.3.1 Engine Controller Board (PWB-A) Removal

1. Remove the video controller board (C108 MAIN board). (Refer to Section 3.2.1.1.)
2. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
3. Remove the control panel. (Refer to Section 3.2.1.3.)
4. Remove the paper cover.
5. Remove the right cover. (Refer to Section 3.2.2.1.)
6. Disconnect connectors CN2, CN6, CN7, CN9, CN8, and CN5 on the engine controller board (PWB-A).
7. Remove 4 CC screws (M3 x 6) on the engine controller board (PWB-A).
8. Remove the engine controller board (PWB-A).

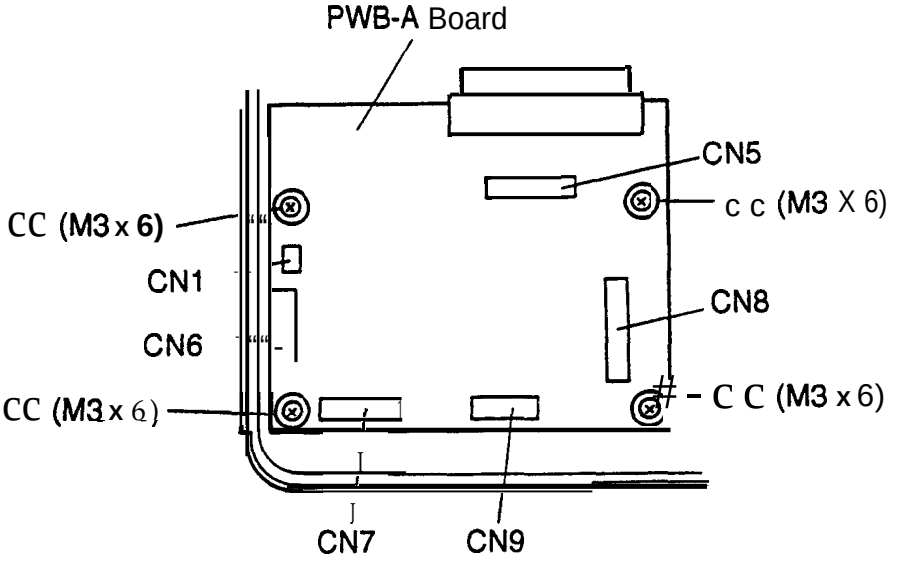


Figure 3-10. Removing the Engine Controller Board (PWB-A)

3.2.3.2 Power Supply Unit (PWB-E) Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the right cover. (Refer to Section 3.2.2.1.)
5. Disconnect connectors CN1, CN4, and CN2 on the power supply board (PWB-E) and CN8 on engine controller board (PWB-A).
6. Disconnect the connectors for the interlock switch.
7. Remove 2 CP(O) screws (M3 x 6), and remove the power supply unit.

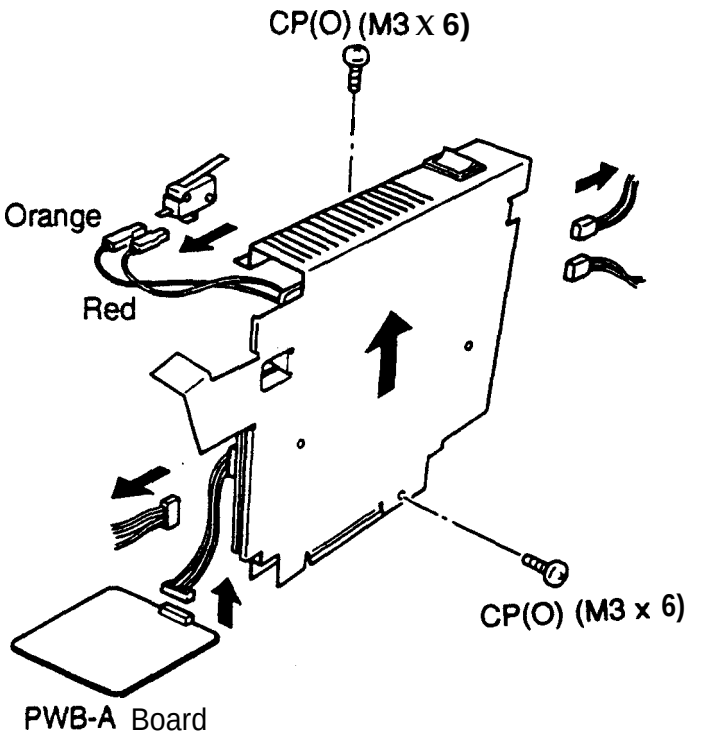


Figure 3-11. Removing the Power Supply Unit

3.2.3.3 Interlock Switch Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the right cover. (Refer to Section 3.2.2.1.)
5. Remove the power supply unit. (Refer to Section 3.2.3.2.)
6. Remove 2 CC screws (M3 x 16) for the interlock switch, and remove the interlock switch.

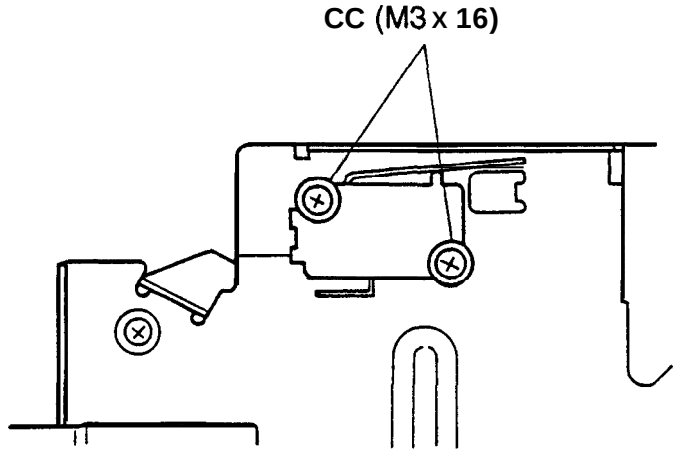


Figure 3-12. Removing the Interlock Switch

3.2.3.4 Printhead Unit Removal

CAUTION

- *Do not touch the printhead unit except at the time of replacement.*
- *Do not open the unit under any conditions.*
- *Do not remove the circuit board from the printhead unit under any condition.*
- *Do not loosen the 2 screws that secured with a black paint (shown in position A in the figure).*
- *Do not loosen the 2 screws (shown in position B in the figure)*

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper guide.
4. Remove the paper guide case. (Refer to Section 3.2.2.1.)
5. Disconnect connector CN5 on the engine controller board (PWB-A).
6. Remove 2 CC screws (M3 x 6) and 1 CC screw (M3 x 12), and remove printhead unit.

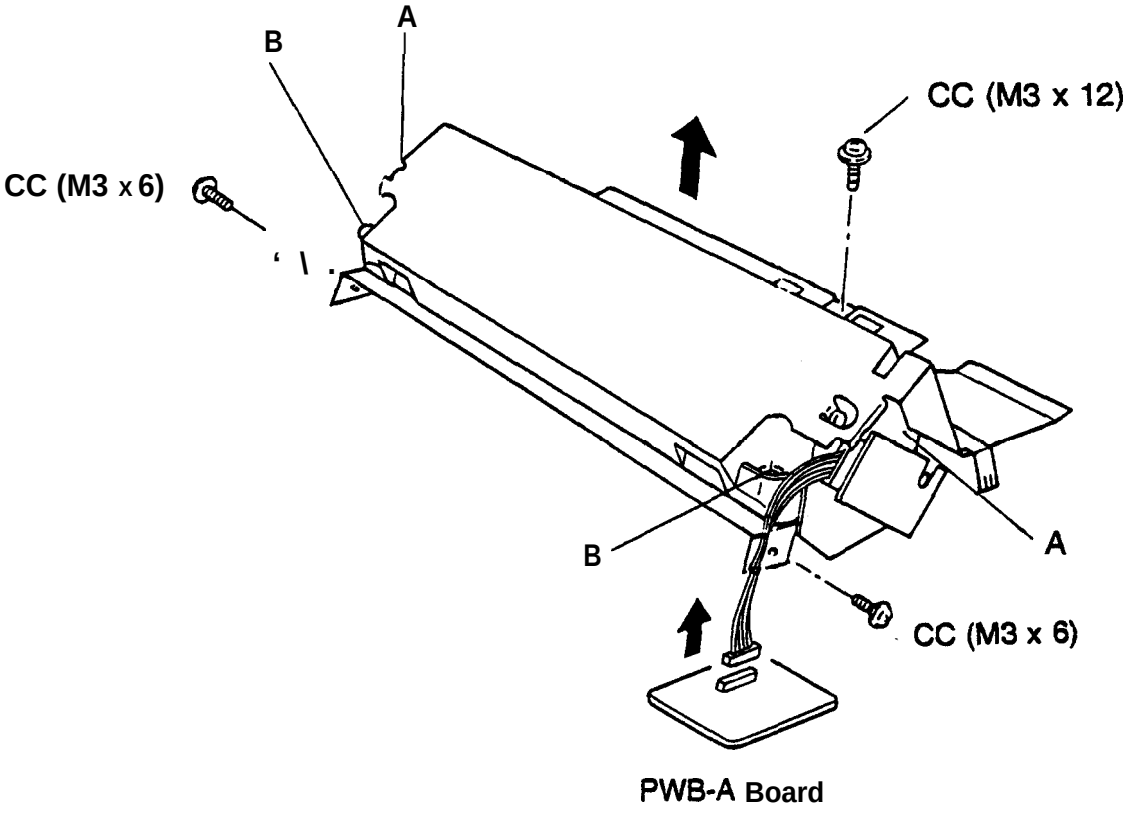


Figure 3-13. Removing the Printhead Unit

3.2.3.5 Paper Empty Sensor Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the paper guide case. (Refer to Section 3.2.2.1.)
5. Remove the power supply unit. (Refer to Section 3.2.3.2.)
6. Remove thepnnthead unit. (Refer to Section 3.3.3.4.)
7. Remove the paper empty sensor.
8. Disconnect the comector for the paper empty sensor.

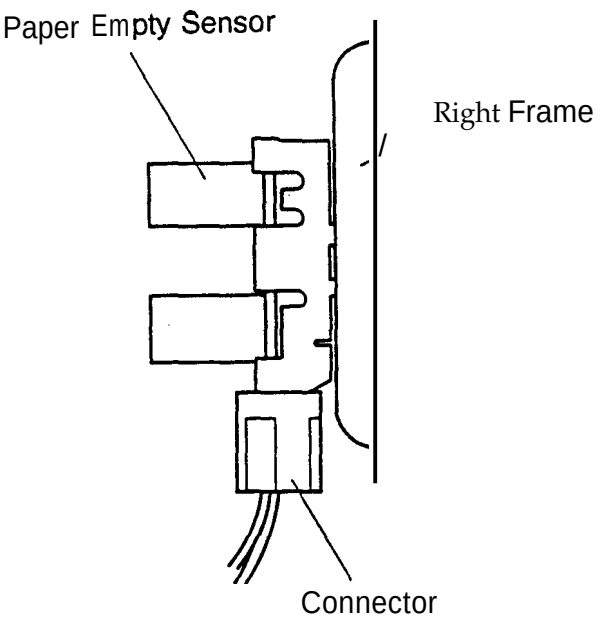


Figure 3-14. Removing the Paper Empty Sensor

3.2.3.6 High Voltage Supply Board (PWB-F) Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove therightcoverand left cover. (Refer to Section 3.2.2.)
5. Remove the top cover.
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Disconnect connectors CN1, CN3, the red wire terminal, and the black wire terminal on the high voltage supply board (PWB-F).
8. Remove 3 CP screws (M3 x 8) on the high voltage supply board, and remove the high voltage supply board (PWB-F).

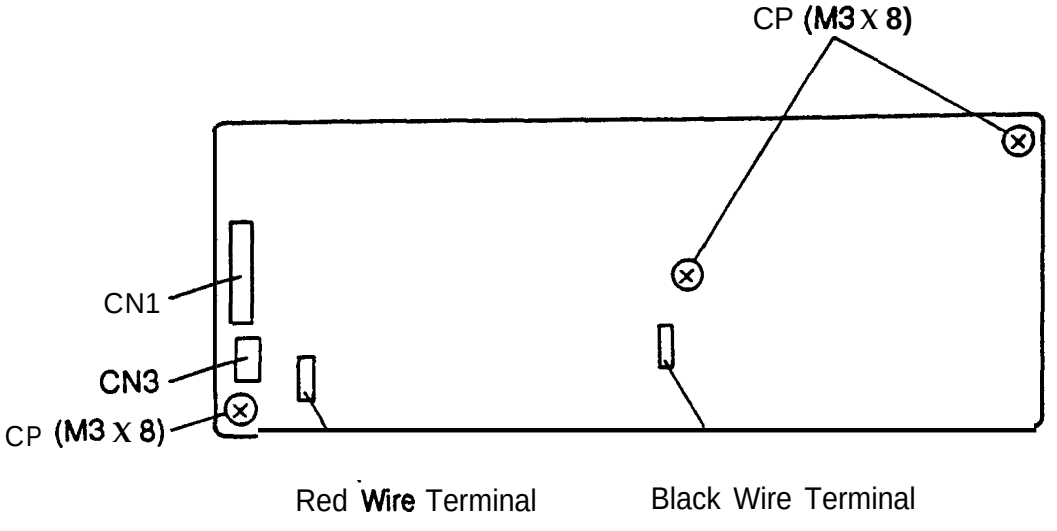


Figure 3-15. Removing the High Voltage Supply Board

3.2.3.7 Main Motor (Ml) Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the right cover and left cover. (Refer to Section 3.2.2.)
5. Remove the top cover.
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Remove 4 CP(S)(P1) screws (M3 x 6) for the main motor (Ml).
8. Lift the main motor (Ml), and discomect the connector for the main motor (Ml).

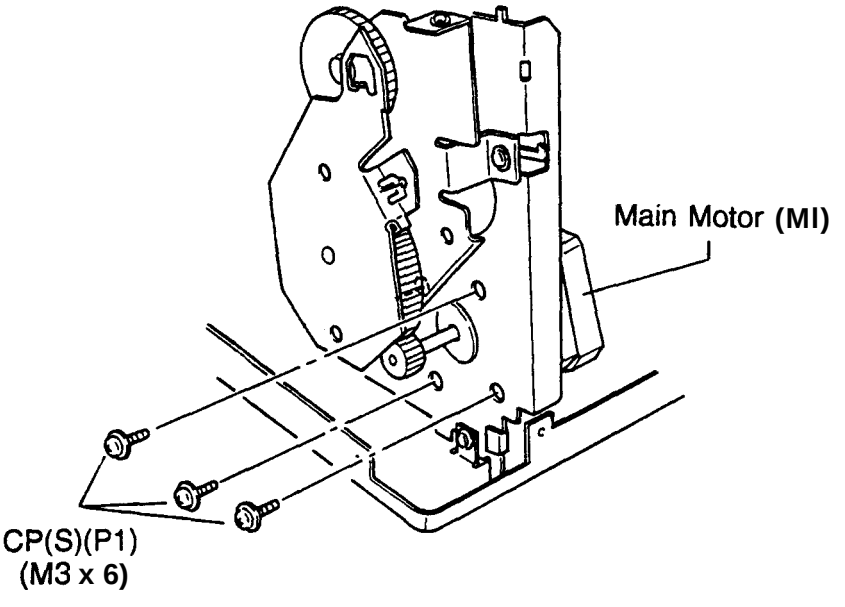


Figure 3-16. Removing the Main Motor

3.2.3.8 Fan Motor (M3) Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the right cover and left cover. (Refer to Section 3.2.2.)
5. Remove the top cover.
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Remove 2 CCB screws (M3 x 8), and remove the fan motor (M3).

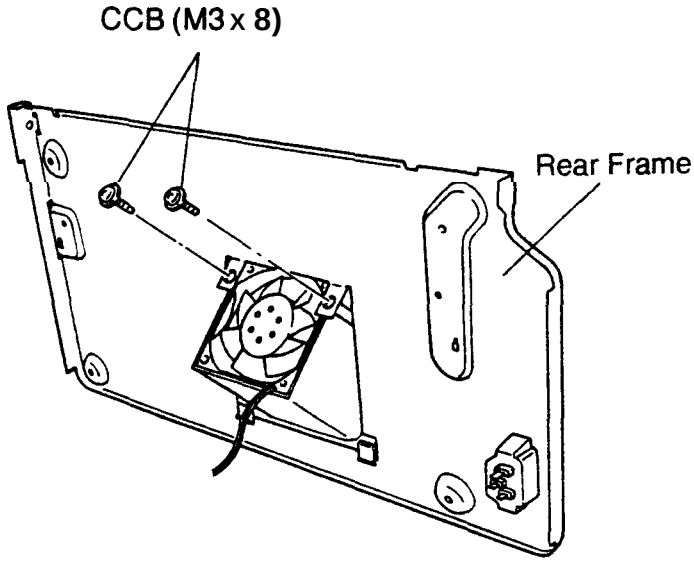


Figure 3-17. Removing the Fan Motor

3.2.3.9 Fusing Unit Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the right cover and left cover. (Refer to Section 3.2.2.)
5. Remove the upper unit.
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Disconnect the connector for the thermistor in the fusing unit, the comector for the paper exit sensor, and CN4 on the power supply board (PWB-E).
8. Remove 2 CP(O) screws (M3 x 6) on the fusing unit, and remove the fusing unit.

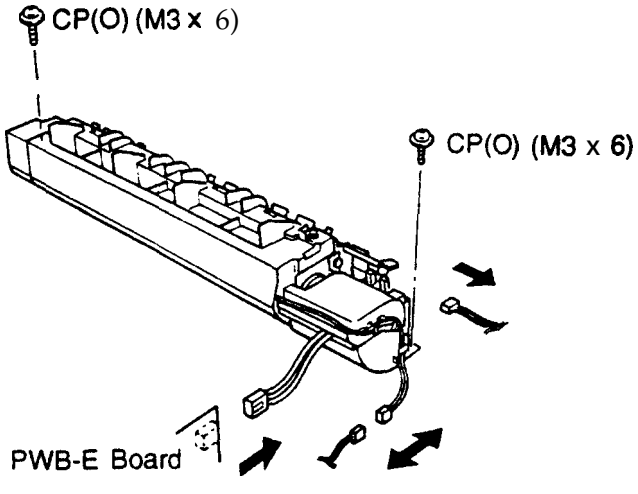


Figure 3-18. Removing the Fusing Unit

3.2.3.10 Fusing Unit Disassembly

This section describes the removing the paper exit sensor, heater lamp, cleaning, lower fusing roller, and upper fusing roller.

1. Remove the fusing unit. (Refer to Section 3.2.3.9.)
2. Remove the paper exit sensor.
3. Remove 2 CC screws (M3 x 6) for the side covers, and remove the side covers.

CAUTION

Do not touch the glass surface of the lamp with your bare hands.

4. Remove 2 CC screws (M3 x 6) on the heater lamp support plate, and remove the heater lamp support plate.
5. Remove the heater lamp.

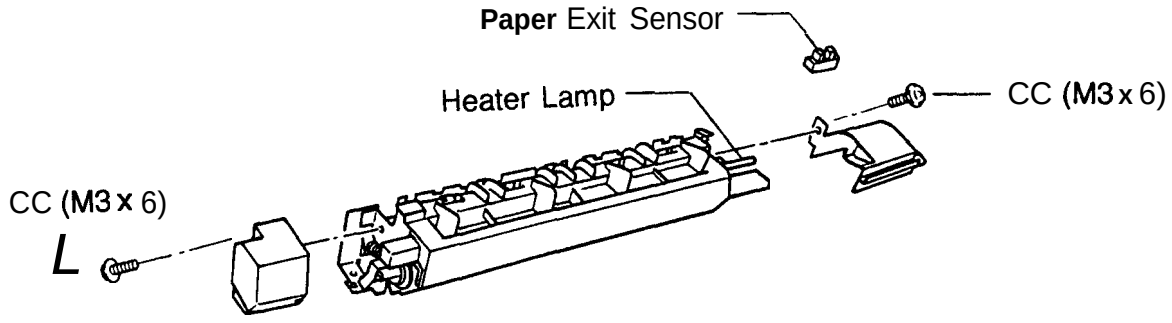


Figure 3-19. Disassembling the Fusing Unit -1

CAUTION

Be careful not to scratch the surface of the upper fusing roller.

6. Remove 2 CC screws (M3 x 6) on the guide plate, and remove the guide plate.
7. Remove 2 springs and 2 bushings on the cleaning roller, and remove the cleaning roller.
8. Remove 2 springs and 2 bushings on the lower fusing roller, and remove the lower fusing roller.
9. Remove 2 C-rings and 2 bushings on the upper fusing roller, and remove the upper fusing roller.

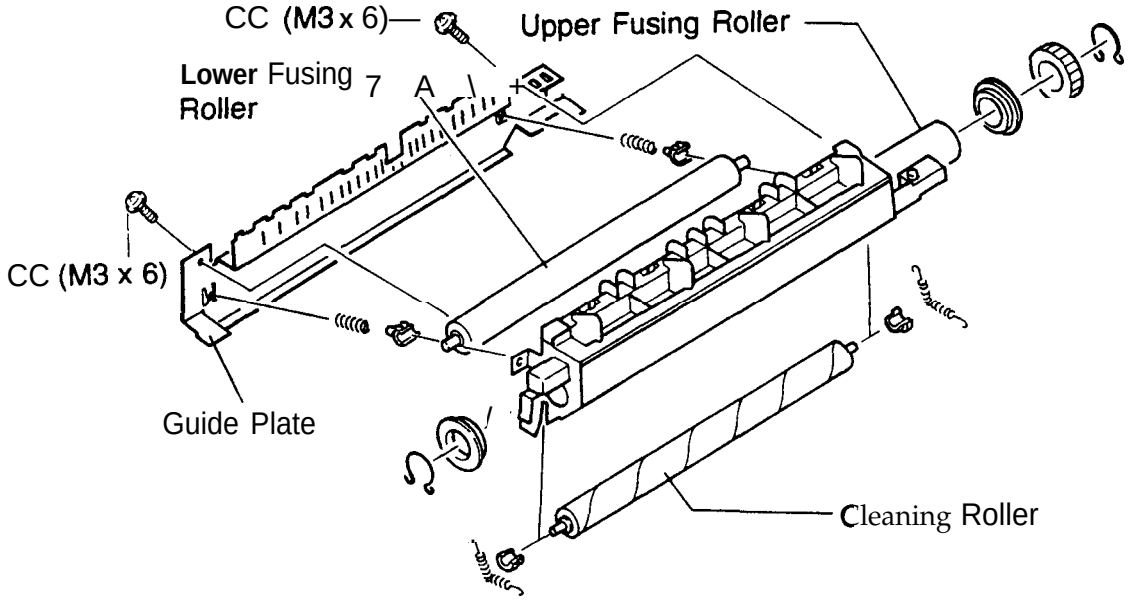


Figure 3-20. Disassembling the Fusing Unit -2

3.2.3.11 Image Transfer Roller Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover.
4. Remove the left and right covers. (Refer to section 3.2.2.1.)
5. Remove the top cover. (Refer to Section 3.2.2.1.)
6. Remove the rear frame. (Refer to Section 32.2.2.)
7. Remove the fusing unit. (Refer to Section 3.23.9.)
8. Slide the image transfer assembly to the left, lift up the right side, and remove the image transfer assembly.
9. Remove the image transfer roller.

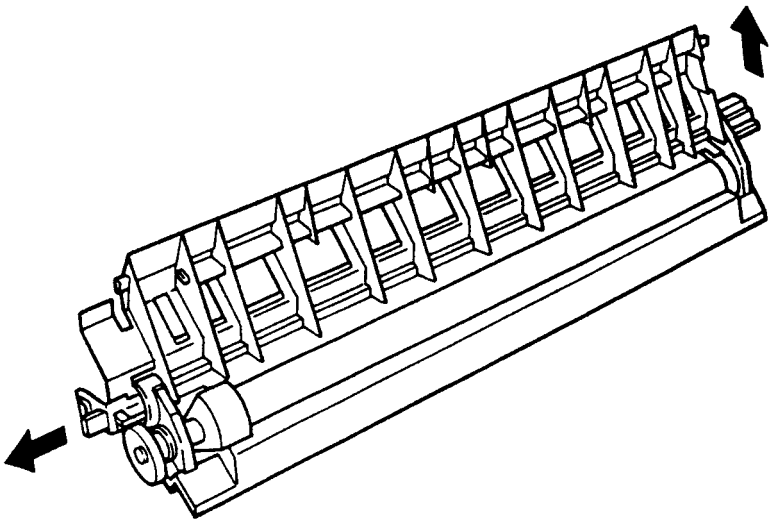


Figure 3-21. Removing the Image Transfer Assembly

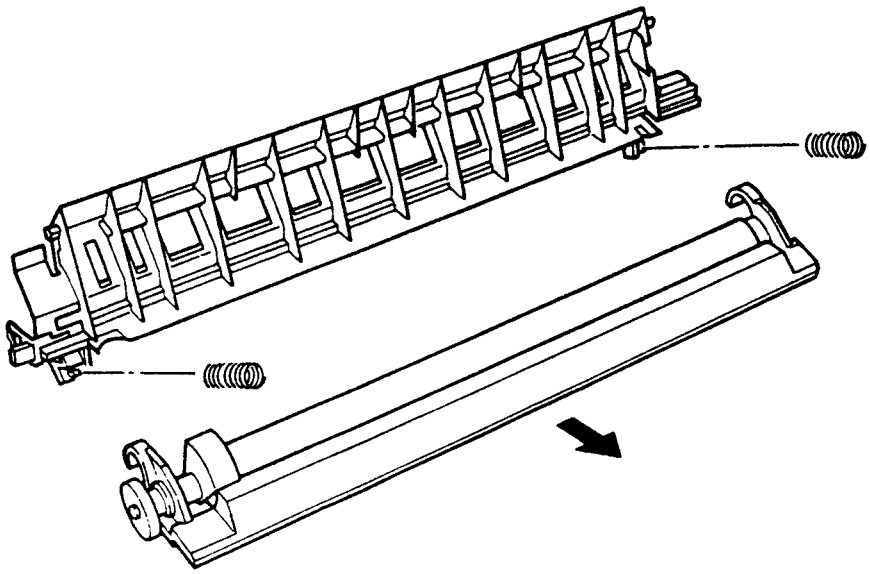


Figure 3-22. Removing the Image Transfer Roller

3.2.3.12 Paper Take-Up Roller Removal

1. Open the top cover. Remove the imaging cartridge. Cover the imaging cartridge to protect it from the light or place it in a dark area.
2. Remove the control panel. (Refer to Section 3.2.1.3.)
3. Remove the paper cover,
4. Remove the left and right covers. (Refer to Section 3.2.2.1.)
5. Remove the top cover. (Refer to Section 3.2.2.1.)
6. Remove the rear frame. (Refer to Section 3.2.2.2.)
7. Remove the fusing unit. (Refer to Section 3.2.3.9.)
8. Remove the power supply unit. (Refer to Section 3.2.3.2.)
9. Remove the printhead unit. (Refer to Section 3.2.3.4.)
10. Remove the image transfer assembly. (Refer to Section 3.2.3 .11.)
11. Disconnect comectors CN1, CN3, the red wire terminal, and the black wire terminal on the high voltage supply board (PWB-F).
12. Remove the 2 CC screws (M3 x 8) on the guide plate.
13. Remove the guide plate and the paper empty sensor flag.
14. Remove 2 CC screws (M3 x 8) on the paper take-up assembly.
15. Slide the paper-take up assembly to the right, lift the left side up, and remove the paper take-up assembly.

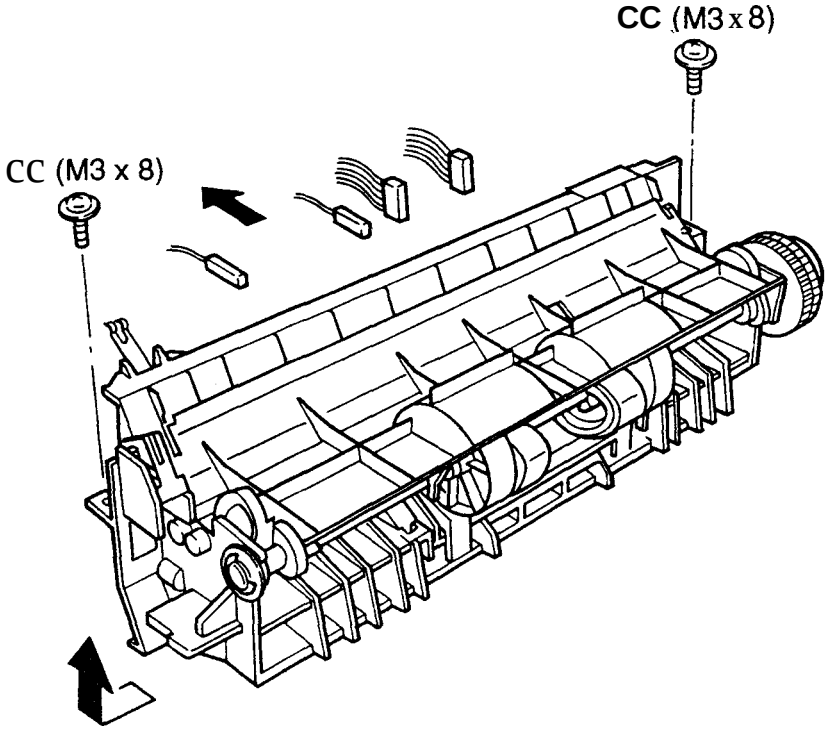


Figure 3-23. Removing the Paper Take-Up Assembly

16. Remove the roller cover.
17. Remove 1 E-ring on the paper take-up clutch, and remove the paper take-up clutch.
18. Remove 2 E-rings and left bushings on the paper take-up roller shaft.
19. Remove the paper take-up roller.

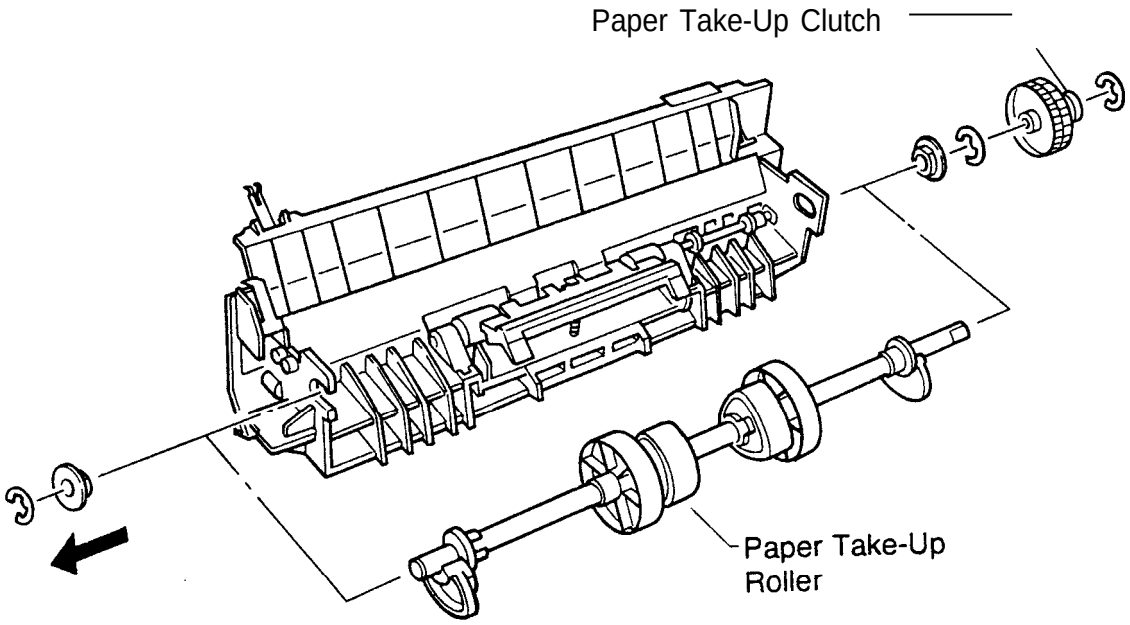


Figure 3-24. Removing the Paper Take-Up Roller

Chapter 4 Adjustment

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4.1 ADJUSTMENT

This section describes the adjustment procedure for the EPL-5000/5200 and ActionLaser 1000/1500. This adjustment must be performed after every servicing operation, especially when any component or part is replaced.

4.1.1 Print Position Adjustment

You can adjust the vertical print position on a sheet of paper by turning the image synchronizing volume control on the engine controller board (PWB-A). After the engine driver board (PWB-A) is replaced, be sure to adjust the print position following the procedure below.

1. Set LANGUAGE to ENGLISH in SelecType Level 2.
2. Run a FEATURE PRINT in SelecType Level 2. Perform the following procedure if the registration gap between the leading edge of paper and the printing of a horizontal line is not the following value:

   FEATURE PRINT page for EPL-5000 and ActionLaser 1000: 34.7 ± 2.5 mm (1.37 ± 0.10 inch)
   FEATURE PRINT page for EPL-5200 and ActionLaser 1500: 35.8 ± 2.5 mm (1.41 ± 0.10 inch)

Note: *The FEATURE PRINT page contains the model name on the upper left side. Check the model name on the FEATURE PRINT page before adjusting. The position of the horizontal line is different for the EPL-5000/ActionLaser 1000 than for the EPL-5200/ ActionLaser 1500.*

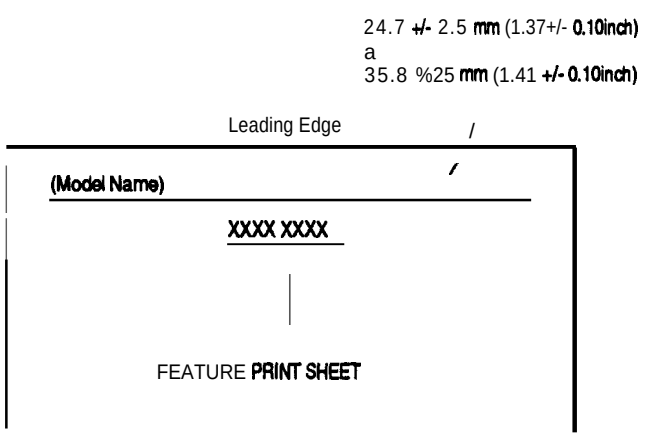

Figure 4-1. Print Position Adjustment

3. Tumtheprinter power off.
4. Open the UPPer unit, open the upper cover, and remove the one screw securing the control panel.

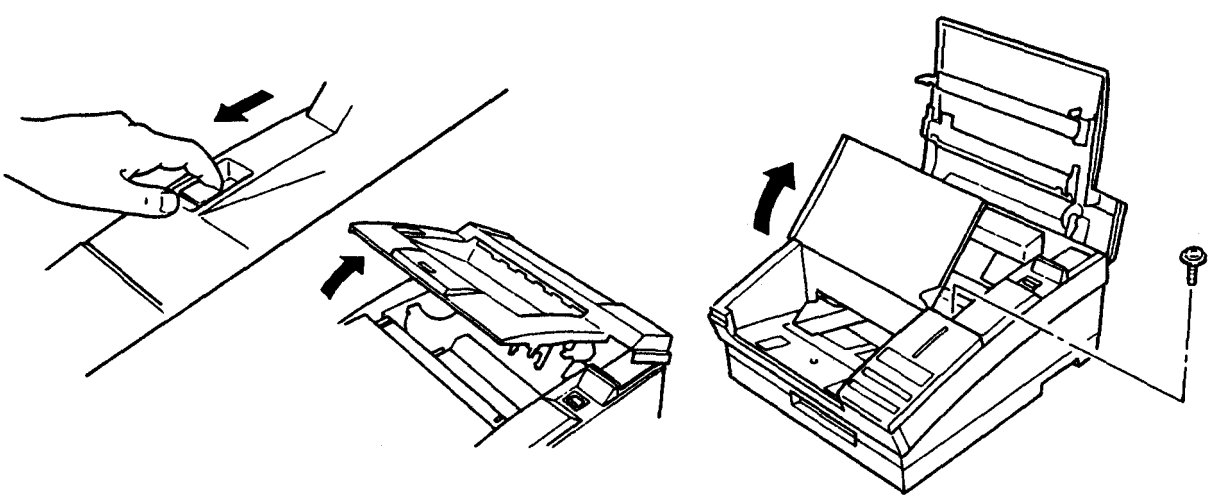

Figure 4-2. Opening the Upper Unit, Upper Cover and Removing 1 Screw

5. While holding the control panel, adjust the image synchronizing adjustment volume (VR1A) on the engine controller board (PWB-A) so that the gap for the print position of the horizontal line (vertical print position) becomes 32.4 mm (1.27 inch) for the EPL-5000/ActionLaser 1000 or 33.5 mm (1.32 inch) for the EPL-5200/ActionLaser 1500.
   - Turn VR1A clockwise to decrease the gap for the print position of the horizontal line.
   - Turn VR1A counterclockwise to increase the gap.
6. Turn on the printer.
7. Run a FEATURE PRINT in SelecType Level 2 again to check the print position.
8. Repeat steps 3 to 7 above until the print position is 32.4 mm (1.27 inch) or 33.5 mm (1.32 inch).
9. Reattach the control panel, securing it with the one screw, close the upper cover, and close the upper unit.

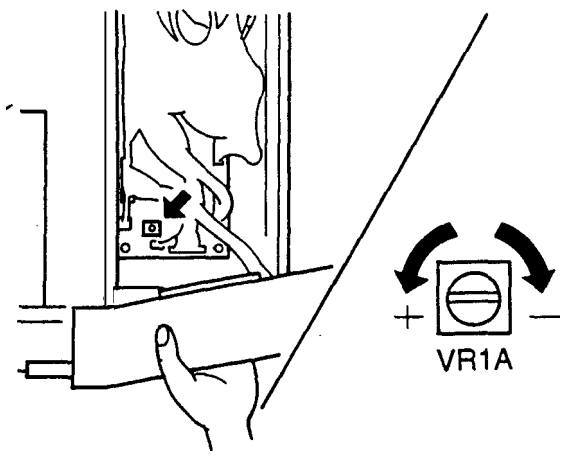

Figure 4-3. Holding the Control Panel and Adjusting VR1A

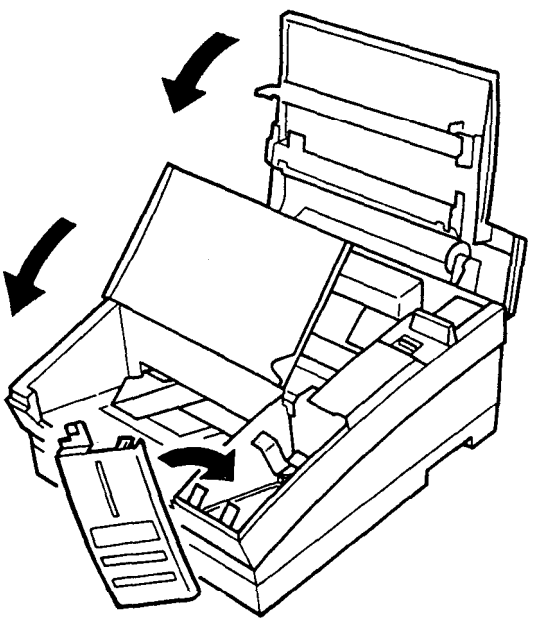

Figure 4-4. Closing the Upper Cover and the Upper Unit

Chapter 5 Troubleshooting

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5.1 OVERVIEW

Troubleshooting most other page printers is difficult to perform, since there maybe wide variety of problems. Unlike with most impact or other types of non-impact printers, with a page printer, even a trivial failure may result in a serious print quality problem. Therefore, the EPL-5000/5200 and ActionLaser 1000/1500 have a sophisticated, built-in, self-diagnostic function that reduces troubleshooting time by identifying failed parts or components.

5.2 SELF-DIAGNOSTIC FUNCTION

This section describes the self-diagnostic *function, in* which the controller automatically checks the operating conditions of each component. If any abnormality is detected, the printer displays an error message on the LCD panel. Table 1-5 lists the messages that tell you if service maintenance is required.

Table 5-1. Messages Requiring Service Maintenance

Error Number	Error Condition	Error Type
E0003	Fusing Unit Error	Engine Error
E0004	Main Motor Error	
E0005	Fan Motor Error	
E0006	Scanner Mirror Motor Error	
E0009	Laser Light Error	
E0014	Communication Error for Engine Controller and Video Controller	
C0002	Bus Error	Video Controller Error
C0003	Address Error	
C0004	illegal Instruction	
C0005	Division by O *(Zero)*	
C0006	CHK Instruction Execution	
C0007	TRAPV Instruction Execution	
C0008	Privilege Violation	
C0009	Trace Mode Execution	
C0010	Unimplemented Instruction	
cool 1	Unimplemented Instruction	
C0015	Uninitialized Interrupt	
CO024	Spurious Interrupt	
cl 000	RAM Error (for any RAM)	
cl110	ROM Error (Location IC5 on the Cl 08 MAIN board)	
cl 120	ROM Error (Location IC7 on the CI08 MAIN board)	
cl 130	ROM Error (Location IC3 on the C82907* ROM-B board)	
cl 140	ROM Error (Location IC6 on the C108 MAIN board)	
C1200	EEPROM Write Error	
C1300	No Ready Task	
C1310	Regeneration of existing task	
C1400	Auto vector interrupt level 7	
C9999	Undefined area emancipation	

[n the above list, E indicates an engine error and C indicates a video controller error. If any of these messages is displayedon the LCD panel, service maintenance is required.

5.3 TROUBLESHOOTING TOOL

There is an extension cable provided for this printer to check the waveforms of the video controller board. You can remove the video controller board (C108 MAIN board) from the board slot and still check its waveforms by connecting the board to the engine with this cable. The following table shows extension cable and connecting points.

Table 5-2. Extension Cable

Connector on Video Controller Board (Cl 08 MAIN Board)	Connector on Engine Controller Board (PWB-A)	Extension Cable	Part Code
CN8	CN1	#F606	1015058

5.4 TROUBLESHOOTING

This section describes the troubleshooting of abnormal operations and print quality problems.

5.4.1 Troubleshooting of Abnormal Operation

This section describes how to detect malfunctions, how to determine the cause, and what actions to take for various types of malfunctions. Each paragraph refers you to a detailed troubleshooting table.

Table 5-3. Symptoms and Reference Table

Symptom	Printer Condition	Reference Table
The printer does not operate at all.	The heater lamp in fusing unit does not come on, and so RAM check is not started.	5-4
RAM check not displayed.	The heater lamp in fusing unit comes on, but RAM check is not started.	5-5
COVER OPEN	The upper unit is closed, but the LCD still displays COVER OPEN.	5-6
PAPER OUT	The paper is loaded into the paper tray, but the LCD displays PAPER OUT.	5-7
ILLEGAL CARD	The LCD displays ILLEGAL CARD.	*5-8*
FEED JAM	The LCD displays FEED JAM.	*5-9*
FEED JAM displayed for the lower paper cassette.	The LCD displays FEED JAM when using the lower paper cassette.	5-1o
PAPER JAM	The LCD displays PAPER JAM at power on.	5-11
PAPER JAM displayed during paper feeding.	The LCD displays PAPER JAM during paper feeding.	5-12
RESELECT TRAY	The lower cassette is installed, but the LCD displays RESELECT TRAY.	5-13
RAM ERROR	The LCD displays RAM ERROR.	5-14
START UP ERROR	The LCD displays START UP ERROR at power on	5-15
SERVICE REQ. E0003	The LCD displays SERVICE REQ. E0003.	5-16

Table 5-3. Symptoms and Reference Table (Continued)

Symptom	Printer Condition	Reference Table
SERVICE REQ. E0004	The LCD displays SERVICE REQ. E0004.	5-17
SERVICE REQ. E0005	The LCD displays SERVICE REQ. E0005.	5-18
SERVICE REQ. E0006	The LCD displays SERVICE REQ. E0006.	5-19
SERVICE REQ. E0009	The LCD displays SERVICE REQ. E0009.	5-20
SERVICE REQ. E0014	The LCD displays SERVICE REQ. E0014.	5-21
SERVICE REQ. C0003	The LCD displays SERVICE REQ. C0003.	5-22
SERVICE REQ. Cl 110	The LCD displays SERVICE REQ. Cl 110.	5-23
SERVICE REQ. Cl 120	The LCD displays SERVICE REQ. Cl 120, and the 4M EPROM is inserted into IC7 on the C108 MAIN board.	5-24
SERVICE REQ. Cl 130	The LCD displays SERVICE REQ. Cl 130, and the C82907* ROM-B board is used.	5-25
SERVICE REQ. Cl 140	The LCD displays SERVICE REQ. Cl 140, and the GQ chip option or the local language ROM is inserted into IC6 on the Cl 08 MAIN board.	5-26
SERVICE REQ. Cl 114	The LCD displays SERVICE REQ. Cl 114.	5-27
Other SERVICE REQ. displayed.	The LCD displays another SERVICE REQ. error code.	5-28

Table 5-4. The Printer Does Not Operate at All

Cause	Step	Checkpoint	Finding	Solution
Connector CN1 on the PWB-E board maybe disconnected.	1	Is connector CN1 on the PWB-E board disconnected?	Yes	Connect CN1 on PWB-E board.
The fuse on the PWB-E board may be blown.	2	Is fuse blown on the PWB-E board?	Yes	Replace the fuse.
Connector CN8 on PWB-A board may be disconnected.	3	Is connector CN8 on the PWB-A board disconnected?	Yes	Connect CN8 on PWB-A board.
PWB-E board maybe dead.	4	With the power on, is there an output of +5 VDC between pin 8 (+) and pin 5 (-) for CN8 on PWB-A board?	No	Replace the PWB-E board.
PWB-A board maybe dead.	5	—	—	Replace the PWB-A board.

Table 5-5. The Printer Does Not Start RAM Check

Cause	Step	Checkpoint	Finding	Solution
The video controller board (C108 MAIN board) maybe dead.	1	Replace the C108 MAIN board, does the printer start the RAM check?	Yes	Replace the C108 MAIN board.
The control panel may be dead.	2	—	—	Replace the control panel.

Table 5-6. The LCD Displays COVER OPEN

Cause	Step	Checkpoint	Finding	Solution
The interlock switch terminal connector may be disconnected.	1	Is interlock switch terminal connector disconnected?	Yes	Connect the terminal connector on the interlock switch.
The interlock switch position may be incorrect.	2	Does the switch turn on when the case is closed?	No	Reseat the interlock switch.
The interlock switch may be dead.	3	Does the switch toggle? (Check with multimeter.)	No	Replace the interlock switch.
The PWB-E board maybe dead.	4	—		Replace the PWB-E board.

Table 5-7. The LCD Displays PAPER OUT

Cause	Step	Checkpoint	Finding	Solution
The paper empty sensor flag position may be incorrect.	1	Is paper empty sensor flag position OK?	No	Reseat the paper empty sensor flag.
The paper empty sensor may be dead.	2	—	—	Replace the paper empty sensor.

Table 5-8. The LCD Displays ILLEGAL CARD

Cause	Step	Checkpoint	Finding	Solution
The installed IC card maybe illegal. (Check the option number and Table 1-2.)	1	Can this printer use the inserted IC card?	No	Replace with a supported IC card.
The IC card maybe dead	2	Does this printer recognize another, legal IC card?	Yes	Replace the IC card.
The CI 08 MAIN board may be dead.	3	—	—	Replace the CI 08 MAIN board.

Table 5-9. The LCD Displays FEED JAM

Cause	Step	Checkpoint	Finding	Solution
Connector for paper take-up solenoid may be disconnected.	1	Is connector disconnected?	Yes	Connect it.
The paper take-up solenoid coil may be open or shorted.	2	Disconnect connector CN6 on the PWB-A board and check coil resistance between pin 7 and pin 8 on the disconnected cable side of the connector using a multimeter. Is the resistance approximately 80 ohms?	No	Replace the paper take-up solenoid.
		If the coil is shorted, check the solenoid drive circuit using the procedure below: 1. Set the multimeter for voltage. 2. Place the (-) terminal of the multimeter on pin 7 of connector CN6 on the PWB-A board. 3. Place the (+) terminal of the multimeter on pin 5 (GND). With power on, does the multimeter detect any current?	Yes	Replace the paper take-up solenoid and the PWB-A board.
Paper take-up sensor flag position may be incorrect.	3	Is paper take-up sensor flag position incorrect?	Yes	Reseat the paper take-up sensor flag
paper take-up roller may be bad.	4	—	—	Replace the paper take-up roller.

Table 5-10. The LCD Displays FEED JAM for Lower Paper Cassette

Cause	Step	Checkpoint	Finding	Solution
The paper take-up solenoid coil for the lower paper cassette may be open or shorted.	1	Disconnect connector PJ2 on the lower paper cassette circuit board and check the coil resistance between pin 1 and pin *2* on the disconnected cable side of the connector using a multimeter. Is the resistance approximately *220* ohms?	No	Replace the paper take-up solenoid.
		If the coil is shorted, check the solenoid drive circuit using the following procedure: 1. Set the multimeter to voltage. *2.* Place the (-) terminal on pin *2* of connector PJ2 on the lower paper cassette board. *3.* Place the (+) terminal on ground to jumper J2. With power on, does the multimeter detect any current?	Yes	Replace the paper take-up solenoid and PWB-A board.
The paper take-up roller in the lower paper cassette may be bad.	2	—	—	Replace the paper take-up roller.

Table 5-11. The LCD Displays PAPER JAM at Power On

Cause	Step	Checkpoint	Finding	Solution
The paper take-up sensor flag position may be incorrect.	1	Is the paper take-up sensor flag position OK?	No	Reposition the paper take-up sensor flag.
The paper exit sensor flag position may be incorrect.	2	Is the paper exit sensor flag position OK?	No	Reposition the paper exit sensor flag.
The paper take-up sensor connector may be disconnected.	3	Is the paper take-up sensor connector disconnected?	Yes	Conned it.
The paper exit sensor connector may be disconnected.	4	Is the paper exit sensor connector disconnected?	Yes	Connect it.
The paper exit sensor may be dead.	5	—	—	Replace it.
The paper take-up sensor may be dead	6	—	—	Replace it.

Table 5-16. The LCD Displays SERVICE REQ. E0003

Cause	Step	Checkpoint	Finding	Solution
The connector for the thermistor may be disconnected.	1	Is the connector for the thermistor disconnected?	Yes	Connect it.
The PWB-A board maybe dead.	2	Does the heater lamp remain lit up until an error occurs?	Yes	Replace the PWB-A board.
The heater lamp or thermal fuse in fusing unit maybe bad.	3	Does the heater lamp come on at power on?	No	Replace the heater lamp or thermal fuse in fusing unit.
The PWB-E board maybe dead.	4	—	—	Replace the PWB-E board.

Table 5-17. The LCD Displays SERVICE REQ. E0004

Cause	Step	Checkpo	Finding	Solution
The main motor coil may be open or shorted.	1	Disconnect connector CN2 on the PWB-E board and check the coil resistance between: pin 1 and pin 2; pin 2 and pin 3; pin 4 and pin 5; and pin 5 and pin 6 (4 points total) on the disconnected cable side of the connector using a multimeter. Pin 1 — Pin 2 Pin 2 — Pin 3 Pin 4 — Pin 5 Pin 5 — Pin 6 Are the resistances of all four points approximately 7 ohms'	No	Replace the main motor.
		If any coil is shorted, check the main motor drive circuit using the following procedure 1. Set the multimeter to voltage. 2. Place the (-) terminal of th multimeter on pins 1, 3, 4, or 6 of connector CN2 on the PWB-E board. 3. Place the (+) terminal on pin 6 of connector CN3 of the PWB-E board (GND). With power on, does the multimeter detect current?	Yes	Replace the WB-E board.
The PWB-E board maybe dead.	2	—	—	eplace the WB-E board.

Table 5-18. LCD Displays SERVICE REQ. E0005

Cause	Step	Checkpoint	Finding	Solution
Connector CN2 on PWB-F board may be disconnected.	1	Is connector CN2 on the PWB-F board disconnected?	Yes	Connect it.
The fan motor may be dead.	2	—	—	Replace it.

Table 5-19. The LCD Displays SERVICE REQ. E0006

Cause	Step	Checkpoint	Finding	Solution
The printhead unit maybe bad.	,	—	—	Replace the printhead unit.
The PWB-A board maybe bad.	2	—	.	Replace the PWB-A board.

Table 5-20. The LCD Displays SERVICE REQ. E0009

Cause	Step	Checkpoint	Finding	Solution
The printhead unit maybe dead.	,	—	—	Replace the printhead unit.
The PWB-A board may be dead	2	—	—	Replace the PWB-A board.

Table 5-21. The LCD Displays SERVICE REQ. EO014

Cause	Step	Checkpoint	Finding	Solution
The PWB-A board maybe bad.	1	—	—	Replace the PWB-A board.
The C108 MAIN board may be bad.	2	—		Replace the C108 MAIN board.

Table 5-22. The LCD Displays SERVICE REQ. C0003

Cause	Step	Checkpoint	Finding	Solution
The C82907* ROM-B board may be bad.	1	—	—	Replace the C82907* ROM-B board.
The Cl 08 MAIN board may be bad.	2	—	—	Replace the C108 MAIN board.

Table 5-23. The LCD Displays SERVICE REQ. C111O

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC5) on the C108 MAIN board may be bad.	1	—	—	Replace the ROM (IC5) on the C108 MAIN board.
The C108 MAIN board may be bad.	2	—	—	Replace the Cl 08 MAIN board.

Table 5-24. The LCD Displays SERVICE REQ. C1120

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC7) on the C108 MAIN board may be bad.	1	—	—	Replace ROM (IC7) on the C108 MAIN board.
The Cl 08 MAIN board may be bad.	2	—	—	Replace C108 MAIN board.

Table 5-25. The LCD Displays SERVICE REQ. C1130

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC3) on the C82907* ROM-B board may be bad.	1	—	—	Replace the ROM (IC3) on the C82907* ROM-B board.
The C82907* ROM-B board may be bad.	2	—	—	Replace the C82907* ROM-B board.
The Cl 08 MAIN board may be bad.	3	—	—	Replace the C108 MAIN board.

Table 5-26. The LCD Displays SERVICE REQ. C1140

Cause	Step	Checkpoint	Finding	Solution
The ROM (IC6) on the Cl 08 MAIN board may be bad.	1	—	—	Replace the ROM (IC6) on the C108 MAIN board.
The C108 MAIN board may be bad.	2	—	—	Replace the C108 MAIN board.

Table 5-27. The LCD Displays SERVICE REQ. C1114

Cause	Step	Checkpoint	Finding	Solution
The EEPROM (IC8) on the Cl 08 MAIN board maybe bad.	1	—	—	Replace the EEPROM (IC8) on the Cl 08 MAIN board.
The Cl 08 MAIN board may be bad.	2	—	—	Replace the C108 MAIN board.

Table 5-28. The LCD Displays Another SERVICE REQ. Error

Cause	Step	Checkpoint	Finding	Solution
The C82907* ROM-B board may be bad.	1	—	.	Replace the C82907* ROM-B board.
The C108 MAIN board may be bad.	2	—	—	Replace the Cl 08 MAIN board.

5.4.2 Print Quality Anomaly

This section describes how to isolate a print quality problem from the possible causes.

Table 5-29. Print Quality Anomaly

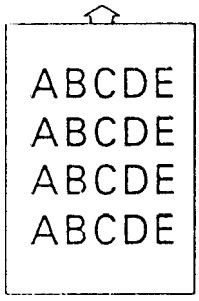
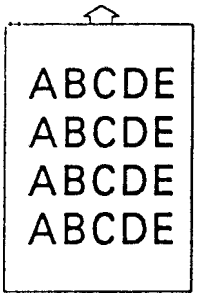
Symptom	Possible Cause	Part Name	Check Item	Remedy
Low image density. 	Poor development	Imaging cartridge	Check the toner level in the imaging cartridge.	Shake the imaging cartridge.
				Replace the imaging cartridge.
		PWB-F board	—	Replace the PWBF board.
	Improper charging	Imaging cartridge	–	Replace the imaging cartridge.
		PWB-F board	—	Replace the PWB-F board.
	Image transfer problem	Image transfer roller	Check to see if the surface of image transfer roller is damaged.	Replace the image transfer roller.
		PWB-F board	—	Replace the PWB-F board.
	Paper problem	Paper	Check to see if paper is moist.	Replace paper
	Defective printhead unit	Printhead unit	‘	Replace the printhead unit.
	Improper print density setting	–	—	Adjust the print density using SelecType level 2.
Foggy background 	Poor development	Imaging cartridge	–	Replace the imaging cartridge.
			Check the wiring of developing bias line.	Replace the PWB-F board.
	Improper charging	Drum charge	—	Replace the PWB-F board.
			Check the wiring of PC drum charging bias line.	Replace the imaging cartridge.
	Improper print density setting in SelecType level 2	—	—	Adjust the print density in SelecType level 2.
	Defective printhead unit	Printhead unit	—	Replace the printhead unit.

Table 5-29. Print Quality Anomaly (Continued)

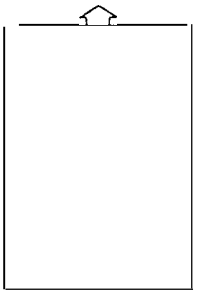
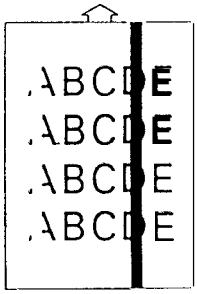
Symptom	Possible Cause	Part Name	Check Item	Remedy
Blank print 	Poor development	Imaging cartridge	Check whether the imaging cartridge is installed properly.	Reinstall the imaging cartridge.
		PWB-F board	—	Replace the PWB-F board.
	Improper charging	PWB-F board	—	Replace the PWB-F board.
	Poor image transfer	Image transfer roller	Check the surface of the image transfer roller.	Replace the image transfer roller.
		PWB-F board	—	Replace the PWB-F board.
	Improper print density setting.	—	—	Adjust the print density in SelecType level 2.
	Defective printhead unit	Printhead unit	—	Replace the printhead unit.
Black print	Improper charging	Imaging cartridge	—	Replace the imaging cartridge.
		PWB-F board	—	Replace the PWB-F board.
	Poor development	Imaging cartridge	—	Replace the imaging cartridge.
		PWB-F board		Replace the PWB-F board.
	Improper setting of the print density.	—	—	Adjust the print density by SelecType level 2.
	Defective printhead unit	Printhead unit	—	Replace the printhead unit.
White/black lines and bands. 	Improper charging	Imaging cartridge	—	Shake the imaging cartridge. Replace the imaging cartridge.
	Poor development	PWB-F board	—	Replace the PWB-F board.
		Imaging cartridge	—	Replace the imaging cartridge.
	Improper drum cleaning	Imaging cartridge	—	Replace the imaging cartridge.
	Dirt on the fusing roller	Fusing roller	—	Clean the fusing roller.

Table 5-29. Print Quality Anomaly (Continued)

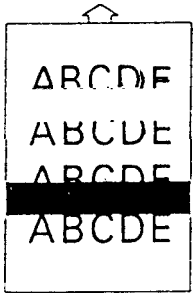
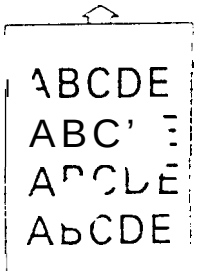
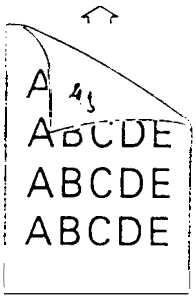
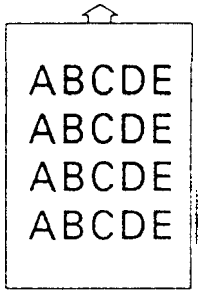
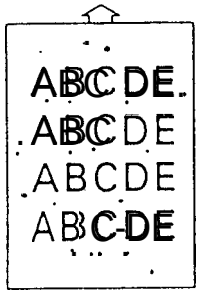
Symptom	Possible Cause	Parts Name	Check ttem	Remedy
White/black lines and bands. 	Improper fusing	Fusing roller	---	Clean the fusing roller.
		Thermistor	—	Replace the thermistor.
	Defective printhead unit	Printhead unit	—	Replace the printhead unit.
	Poor image transfer	Image transfer roller	Check the surface of image transfer roller.	Replace the image transfer roller.
Areas of missing print. 	Poor image transfer	Image transfer roller	Check the surface of the image transfer roller.	Replace the image transfer roller.
		PWB-F board	—	Replace the PWB-F board.
	Poor development	Imaging cartridge	–	Shake the imaging cartridge.
			—	Replace the imaging cartridge.
	Poor development	PWB-F board	—	Replace the PWB-F board.
	Paper problem	Paper	Check to see if paper is moist.	Replace the paper.
Toner smudges on back side of pages 	Smears on paper path.	Image transfer roller	Check the surface of image transfer roller.	Clean the image transfer roller.
		Fusing roller	—	Clean the fusing roller
		Other paper paths	Check the paper path.	Clean the paper path.
Print offset 	Improper fusing	Fusing roller	Check if there is any dust or damage on the fusing roller surface.	Clean or replace fusing roller.
	Dirty drum	Imaging Cartridge		Replace the imaging cartridge.

Table 5-29. Print Quality Anomaly (Continued)

Symptom	Possible Cause	Parts Name	Check Item	Remedy
Black specks or dots 	Poor development	Imaging cartridge		Shake the imaging cartridge. Replace the imaging cartridge.
		PWB-F board		Replace the PWB-F board.
	Defective PC drum	Imaging cartridge		Replace the imaging cartridge.

Chapter 6 Maintenance

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6.1 MAINTENANCE

The EPL-5000/5200 and ActionLaser 1000/1500 are page printers that use an electrophotographic printing method. Unlike with most impact or ink-jet printers, the key components in the electrographic process are integrated into an expendable cartridge (the imaging cartridge). Therefore, periodic replacement of the imaging cartridge is essential to ensure high-quality output. Other maintenance items are also described in this section, which is divided into two portions: user maintenance (preventive maintenance) and service maintenance (repair).

6.1.1 User Maintenance

Users can achieve maximum print quality from the printer by following the procedures below:

6.1.1.1 Cleaning

This section describes the cleaning required for optimal print quality.

● ExternalCleaning

Be sure to discomect the printer from the power outlet before cleaning it. Wipe the cover and external parts of the printer with a damp cloth that has been soaked in a neutral cleaning solution.

● Internal Cleaning

Be sure the printer has been discomected from the power supply and that the fusing unit has cooled down. If the printhead unit lens is dirty, clean it using a soft cloth.

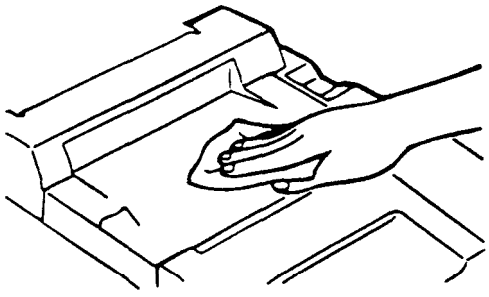

Figure 6-1. External Cleaning

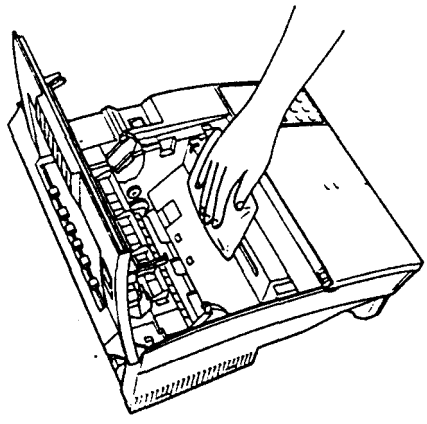

Figure 6-2. Cleaning Printhead Unit Lens

6.1.1.2 Consumable Replacement

This printer uses consumable imaging cartridge SO51O11. The life of this cartridge is 6000 pages, when printing on A4 or letter size pages with a print ratio.

If printed images become faint, you may recover darker printing by shaking the imaging cartridge. Change the imaging cartridge when printing is still light after shaking the cartridge. The procedure for changing the imaging cartridge is described below.

● Imaging Cartridge Replacement

1. Gently open the upper unit and remove the imaging cartridge by pulling ....
2. Dispose of the used imaging cartridge.
3. holding the new imaging cartridge horizontally, gently shake it a few times to distribute the toner evenly.

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gram

Figure 6-3. Removing the Imaging Cartridge

Figure 6-4. Shaking the Imaging Cartridge

4. Set the imaging cartridge on a clean, flat surface. Firmly grip the tab on the left side of the cartridge. Pull the clear seal all the way out with firm, even pressure, as shown.
5. Shake the imaging cartridge again.
6. Insert the imaging cartridge into the printer by placing the pins on each side of the cartridge into the grooves inside the printer. Slide it gently into the opening until it stops Leave the cover open.

Figure 6-5. the Clear

Figure 6-6. Inserting the Imaging Cartridge

● Reset the TONER Setting

This printer does not have a toner out sensor, but it does have a toner counter in EEPROM on the C108 MAIN board. YOU must reset the this counter when replacing the imaging cartridge. The counter reset procedure has the two options below:

When LCD displays
NEW CARTRIDGE? -- YES, PRESS RESET – NO, PRESS CONTINUE.:
Press the RESET button on the control panel.

When LCD does not display
NEW CARTRIDGE? - YES, PRESS RESET - NO, PRESS CONTINUE.:
Select the TONER option in SelecType Level 2, and then select NEW.

Notes : 1. The toner counter increments at the same rate as the page counter until you reset the toner counter when you install a cartridge.

2. When you want to move an imaging cartridge from one printer to another:

- Check the current setting for the toner counter in the first printer (from E* F for low toner to E*****F for full toner level).
- Select TONER in SelecType Level 2 in the second printer, and set the toner counter to the same value as the counter for the first printer.

Figure 6-7 shows an example of when the toner counter is "E*** F."

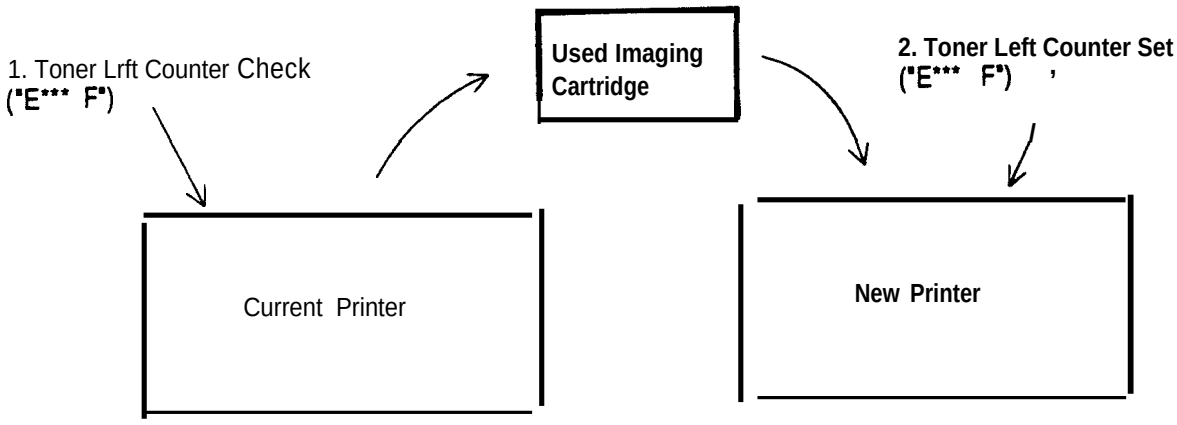

Figure 6-7. Toner Counter Setting

3. If you remove an imaging cartridge from a printer with a malfunction that makes it impossible for you to read the toner counter, you can use the weight of the imaging cartridge to set the toner counter when you install the cartridge again. Table 6-1 shows how the weight of an imaging cartridge corresponds to the toner counter value.

Table 6-1. Weight and Toner Counter Value

Toner Counter	Percentage of Toner Left	Used Imaging Cartridge Weight
NEW	10070	1060 ± 10 g (37.1 ± 0.4 oz.)
E*****F	99 - 80 %	1060- 1036 g (37.1 -36.3 oz.)
E•*** F	79 - 60%	1035 - 1011 g (36.2 -35.4 oz.)
E•** F	59 - 40 %	1010 - 986 g (35.4 -34.5 oz.)
E•* F	39 - 20 %	985 - 961 g (34.5 -33.6 oz.)
c* F	19 - 0 %	Less than 960 g (33.6 oz.)

6.1.2 Service Maintenance

This section describes the periodic service maintenance and cleaning required.

6.1.2.1 Periodic Service Maintenance

The following units require periodic service maintenance, because they are subject to functional deterioration as the total number of printed pages increase, resulting in bad print quality.

Table 6-2. Periodic Service Maintenance

Unit	Service Interval
image Transfer Roller	Approx. 100,000 pages
) Pin As Unit	. . . . .

' service interval ' " above is only a reference value. You do not need to perform service maintenance exactly at this time.

6.1.2.2 Cleaning

Some parts of this printer require regular cleaning.
Clean each part using the specified method and tools. (Refer to Chapter 3 for of disassembly.)

Table 6-3. Cleaning Parts and Procedures

Parts Name	Cleaning Procedure
Image Transfer Roller	Wipe the surface with a dry cloth.
Printhead Lens	
Paper Take-Up Roller	
Upper Fusing Roller (in Fusing Unit)	Dip a soft cloth in silicon oil and wipe the dust off.
Lower Fusing Roller (in Fusing Unit)	
Thermistor (in Fusing Unit)	Dip a soft cloth in denatured alcohol and wipe the dust off.
and Rollers (in	

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A.1 CONNECTOR PIN ASSIGNMENTS

Figures A-1 and A-2 illustrate the interconnection of the primary components. Table A-1 gives the size and a description of each connector.

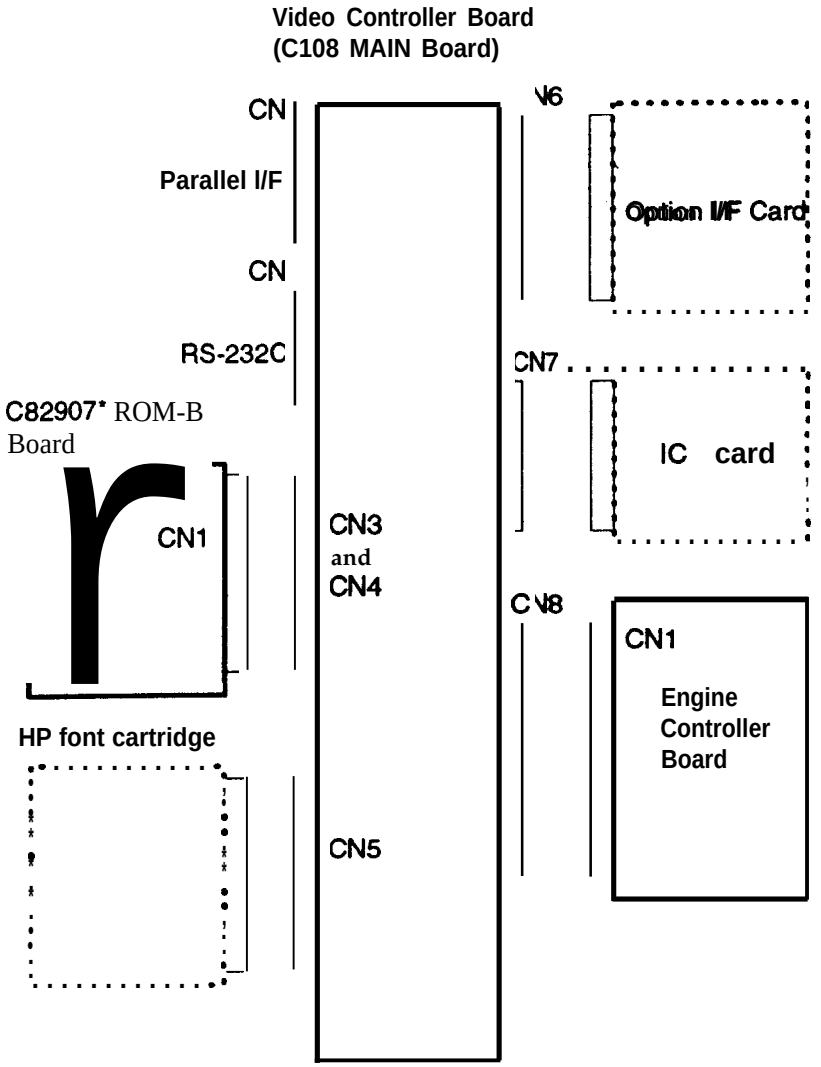

Figure A-1. Cable Connections for the Video Controller Section

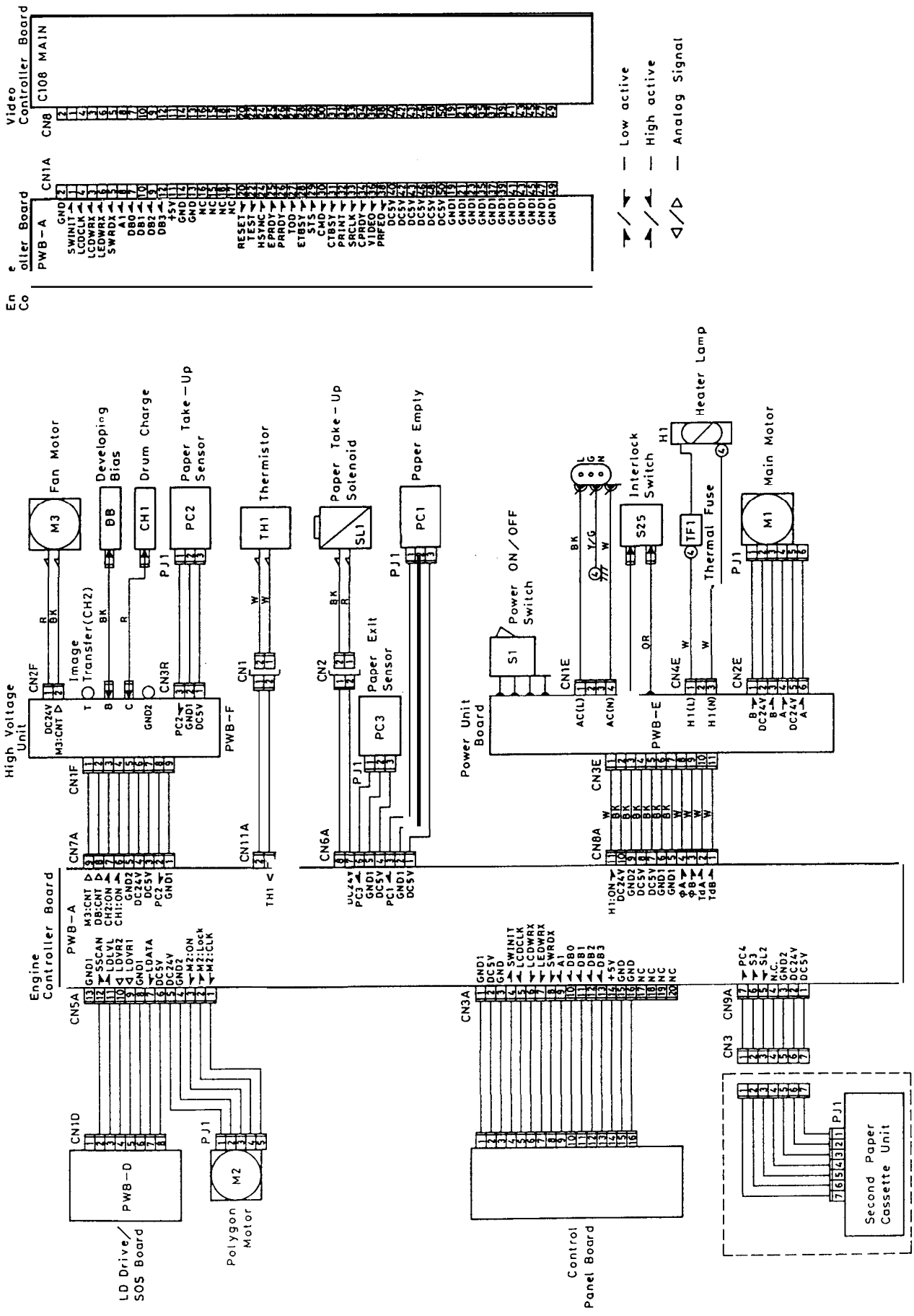

Figure A-2. Cable Connections for the Engine Section

Table A-1. Board Connector Summary

Connector	Description	Pins	Reference
Video Controller Board (C108 MAIN Board)			
CN1	Centronics parallel interface	36 pins	Table 1-13
CN2	Serial (RS-232C) interface	25 pins	Table 1-14
CN3	Connector for PCL5/RITech upgrade board (C82907* ROM-B board)	84 pins	Table A-2
CN4	Connector for PCL5/RITech upgrade board (C82907* ROM-B board)	16 pins	Table A-3
CN5	Connector for HP font cartridge	50 pins	Table A-4
CN6	Connector for optional I/F (Type-B) card	36 pins	Table A-5
CN7	Connector for IC card	50 pins	Table A-6
CN8	Connector for engine controller board (PWB-A board)	50 pins	Table A-7
PCL5/RITech Upgrade Board (C82907 ROM-B Board)*			
CN1	Connector for video controller board (C108 MAIN board)	80 pins	Table A-2 Table A.3
Engine Controller Board (PWB-A Board)			
CN1	Connector for video controller board (C108 MAIN bed)	50 pins	Table A-7
CN2	Not used	·	—
CN3	Connector for control panel	16 pins	—
CN4	Not used	—	—
CN5	Connector for printhead unit	13 pins	Table A-8
CN6	Connector for paper take-up solenoid, paper exit sensor, and paper empty sensor	8 pins	Table A-9
CN7	Connector for high voftage supply board (PWB-F board)	9 pins	Table A-10
CN8	Connector for power suppfy board (PWB-E board)	11 pins	Table A-1 1
CN9	Connector for lower paper cassette	7 pins	Table A-1 2
CN1O	Not used	—	—
CN11	Connector for thermistor	2 pins	Table A-1 3
Control Panel			
CN1	Connector for engine controller board (PWB-A board)	16 pins	—
Power Supply Board (PWB-E Board)			
CN1	Connector for AC power inlet	4 pins	—
CN2	Connector for main motor	6 pins	Table A-14
CN3	Connector for engine controller board (PWB-A board)	11 pin	Table A-1 1
CN4	Connector for heater lamp	3 pins	Table A-15
High Voltage Supply Boa& (PWB-F Board)			
CN1	Connector for engine controller board (PWB-A board)	9 pins	Table A-1 O
CN2	Connector for fan motor	2 pins	Table A-16
CN3	Connector for paper take-up sensor	3 pins	Table A-1 7

A.1.1 Video Controller Board (C108 MAIN Board)

Table A-2. CN3 Pin Assignment

Pin No.	Signal Name	I/O	Description
1,2	+5 V	—	+5 VDC
3,4	GND	—	Ground
5	D2	I/O	Data bus bit 2
6	D3	I/O	Data bus bit 3
7	D0	I/O	Data bus bit O
8	D1	I/O	Data bus bit 1
9	D6	I/O	Data bus bit 6
10	D7	I/O	Data bus bit 7
11	D4	I/O	Data bus bit 4
12	D5	I/O	Data bus bit 5
13	D10	I/O	Data bus bit 10
14	D11	I/O	Data bus bit 11
15	D8	I/O	Data bus bit 8
16	D9	I/O	Data bus bit 9
17	D14	I/O	Data bus bit 14
18	D15	I/O	Data bus bit 15
19	D12	I/O	Data bus bit 12
20	D13	I/O	Data bus bit 13
21	AI	o	Address bus bit 1
22	A2	0	Address bus bit 2
23,24	GND	—	Ground
25	A5	o	Address bus bit 5
26	A6	0	Address bus bit 6
27	A3	0	Address bus bit 3
28	A4	0	Address bus bit 4
29	A9	0	Address bus bit 9
30	A10	0	Address bus bit 10
31	A7	0	Address bus bit 7
32	A8	0	Address bus bit 8
33	A13	0	Address bus bit 13
34	A14	0	Address bus bit 14
35	AI 1	0	Address bus bit 11
36	A12	0	Address bus bit 12
37	A17	0	Address bus bit 17
38	A18	0	Address bus bit 18
39	A15	0	Address bus bit 15
40	A16	0	Address bus bit 16
41	A21	0	Address bus bit 21
42	A22	0	Address bus bit 22
43	A19	0	Address bus bit 19
44	A20	0	Address bus bit 20
45	$\overline{\text{ICDG}}$	0	IC card data bus drive enable
46	$\overline{\text{ICENB}}$	I	IC card enable
47	A23	o	Address bus bit 23
48	WR	0	Write enable
49	UDS	0	Upper data strobe
50	LDS	0	Lower data strobe
51	$\overline{\text{AS}}$	0	Address strobe

Table A-2. CN3 Pin Assignment (Continued)

Pin No.	Signal Name	I/O	Description
52	$\overline{RW}$	o	Read/write signal
53	FC1	0	Mode/cycle type signal 1
54	FC2	0	Mode/cycle type signal 2
55	$\overline{DTACK}$	I	Data acknowledge signal
56	FC0	o	Mode/cycle type signal O
57	$\overline{CG1}$	0	Font ROM 1 select
58	$\overline{PROGENB}$	I	Program ROM select
59	$\overline{RD}$	o	Read enable
60	HLT	0	HALT signal
61	MCLK	0	Clock from CPU
62	SCLK	0	Not used
63	I D0	I	Board identification O
64	ID1	I	Board identification 1
65	CG4	o	Font ROM 2 select
66	CG3	0	Font ROM 3 select
67	$\overline{RESET}$	0	Reset signal
68	$\overline{OPT1}$	0	Option select
69,70	+5 V	—	+5 VDC
71	$\overline{OPTINIT}$	I	Initialize signal from the option
72	CG2	0	Font ROM 2 enable
73	$\overline{NMI}$	I	NMI signal
74	$\overline{PRG3}$	o	Code ROM enable
75,76	GND	—	Ground
77	CG5	o	Font ROM 5 enable
78	$\overline{BERR}$	0	Cycle error
79	RST	I	Reset signal from the option
80	CG6	o	Font ROM 6 enable
81,82	+5 V	—	+5 VDC
83	—	—	
84	GND	—	Ground

Table A-3. CN4 Pin Assignment

Pin No.	Signal Name	I/O	Description
1,3	GND	—	Ground
2,4	+5 v	—	+5 VDC
5	SVCLK	o	Video signal clock
6	ICINH	0	Option ROM disable
7	VDOUT	I	video signal
8	VIDEO	o	Video signal
9	$\overline{OPT1}$	0	Option select
10	HSYNC	0	HSYNC for the video I/F
11	$\overline{RESET}$	0	Reset signal
12	$\overline{CS}$	0	Option select
13	$\overline{OPTINT2}$	I	Initialize signal from the option
14	$\overline{ROM2X}$	o	ROM 2 select
15	RIT1	I	RITech IC identification 1
16	RIT2	I	RITech IC identification 2

Table A-4. CN5 Pin Assignment

Pin No.	Signal Name	I/O	Description
AI	ASX	O	Address strobe
A2	LDSX	0	Lower data strobe
A3	NC	—	Not connected
A4	FCX	o	Font cartridge enable
A5	A2	0	Address bus bit 2
A6	A4	0	Address bus bit 4
A7	A6	0	Address bus bit 6
A8	A8	0	Address bus bit 8
A9	A10	0	Address bus bit 10
AIO	A12	0	Address bus bit 12
A11	A14	0	Address bus bit 14
A12	A16	0	Address bus bit 16
A13	Ala	0	Address bus bit 18
A14	A20	0	Address bus bit 20
A15	D1	I/O	Data bus bit 1
A16	D3	I/O	Data bus bit 3
A17	D5	I/O	Data bus bit 5
Ala	D7	I/O	Data bus bit 7
A19	D9	I/O	Data bus bit 9
A20	D11	I/O	Data bus bit 11
A21	D13	I/O	Data bus bit 13
A22, 23	GND	—	Ground
A24, 25	+5 V	—	+5 VDC
B1	UDSX	o	Upper data strobe
B2	FCX	0	Address decode
B3	GND	—	Ground
B4	AI	o	Address bus bit 1
B5	A3	0	Address bus bit 3
B6	A5	0	Address bus bit 5
B7	A7	0	Address bus bit 7
B8	A9	0	Address bus bit 9
B9	AI 1	0	Address bus bit 11
B10	A13	0	Address bus bit 13
B11	A15	0	Address bus bit 15
B12	AI 7	0	Address bus bit 17
B13	A19	0	Address bus bit 19
B14	DO	I/O	Data bus bit O
B15	D2	I/O	Data bus bit 2
B16	D4	I/O	Data bus bit 4
B17	D6	I/O	Data bus bit 6
B18	Da	I/O	Data bus bit 8
B19	D10	I/O	Data bus bit 10
B20	D12	I/O	Data bus bit 12
B21	D14	I/O	Data bus bit 14
B22	D15	I/O	Data bus bit 15
B23	RWX	o	Read/write strobe
B24	FCEX	0	Font cartridge enable
B25	MCLK	0	Clock from CPU

Table A-5. CN6 Pin Assignment

Pin No.	Signal Name	I/O	Description
1-6	+5V	—	+5 VDC
7	TXD	o	Transmitted data
8	READY	o	Ready signal
9	RXD	I	Received data
10	NC	—	Not connected
11	RESET	o	Reset signal
12	INH	o	I/F disabled
13	CMREQ	I	Request command
14	WRRDY	I	I/F ready
15	RDREQ	I	Data read request
16	WR	o	Write enable
17	RD	o	Read enable
18	CS	o	Chip select
19-24	GND	—	Ground
25-28	A3-A0	o	Address bus bit 3-O
29-36	D7-D0	I/O	Data bus bit 7-O

Table A-6. CN7 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	GND	—	Ground
2	+5 v	—	+5 VDC
3	FINX	o	IC card enable
4	FOUTX	I	Not used
5-20	DB15-DBO	I/O	Date bus bit 15-0
21	SET	I	IC card presence check
22-42	AB21 -AB1	o	Address bus bit 21-1
43	CSX	o	IC card select
44	R/w	o	Read/write strobe
45	UDSX	o	Upper data strobe
46	LDSX	o	Lower data strobe
47	DTX	I	Not used
48	MCLK	o	Clock from CPU
49	+5 v	—	+5 VDC
50	GND	—	Ground

Table A-7. CN8 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	SWINIT	I	Switch interrupt
2	GND ‘	—	Ground
3	LCDWRX	o	Write strobe to LCD
4	LCDCLK	o	Clock to LCD
5	SWRDX	o	Read strobe to switch
6	LEDWRX	o	Write enable to LED
7	DB0	I/O	Data bus bit O
8	AI	o	Address bus bit 1
9	DB2	I/O	Data bus bit 2
10	DB1	I/O	Data bus bit 1
11	+5 V	—	+5 VDC
12	DB3	I/O	Data bus bit 3
13, 14	GND	—	Ground
15-18	NC	—	Not connected
19	GND	—	Ground
20	RESETX	o	Reset signal
21	GND	—	Ground
22	NC	—	Not connected
23	GND	—	Ground
24	HSYNCX	I	HSYNC for video I/F
25	EPRDYX	I	Engine controller ready
26	PRDYX	I	Print ready
27	TODX	I	Video request
28	ETBSYX	I	Engine controller busy
29	STSX	I	Status transfer
30	CMDX	o	Command transfer
31	CTBSYX	o	Video controller busy
32	PRINITX	o	Print signal
33	SRCLKX	o	Serial transfer clock
34	CPRDYX	o	Video controller ready
35	GND	—	Ground
36	VIDEOX	o	Video signal
37	GND	—	Ground
38	NC	—	Ground
39	GND	—	Ground
40	+5 v	—	+5 VDC
41	GND	—	Ground
42	+5 v	—	+5 VDC
43	GND	—	Ground
44	+5 v	—	+5 VDC
45	GND	—	Ground
46	+5 v	—	+5 VDC
47	GND	—	Ground
48	+5 v	—	+5 VDC
49	GND	—	Ground
50	+5 v	—	+5 VDC

A.1.2 Engine Controller Board (PWB-A Board)

Table A-8. CN5 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	M2:CLK	o	M2 drive clock
2	M2:LOCK	I	M2 look signal
3	M2:ON	o	M2 drive
4	GND2	—	Ground
5	24 VDC	—	+24 VDC
6	5 VDC	—	+5 VDC
7	LDATA	o	Laser data
8	GND1	—	Ground
9	LDVR1	o	Laser power adjust 1
10	LDVR2	0	Laser power adjust 2
11	LDLVL	I	Laser power signal
12	SSCAN	I	Horizontal synchronous signal
13	GND1	—	Ground

Table A-9. CN6 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	5 VDC	—	+5 VDC
2	GND1	—	Ground
3	PC1	I	Paper empty
4	5 VDC	—	+5 VDC
5	GND1	—	Ground
6	PC3	I	Paper exit
7	24 VDC	—	+24 VDC
8	SL1 :ON	o	Paper take-up solenoid drive

Table A-10. CN7 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	GND1	—	Ground
2	PC2	I	Paper take-up
3	DC5V		+5 VDC
4	DC24V	—	+24 VDC
5	GND2	—	Ground
6	CH1:ON	O	Drum charge on
7	CH2:ON	0	Image transfer on
8	DB:CNT	0	Developing bias control
9	M3:CNT	0	M3 control

Table A-1 1. CN8 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	TdB	o	Ml phase B control
2	TdA	o	Ml phase A control
3	@B	o	Ml phase B clock
4	ϕA	o	Ml phase A clock
5,6	GND1	—	Ground
7,8	5 VDC	—	+5 VDC
9	GND2	—	Ground
10	24 VDC	—	+24 VDC
11	HI :ON	o	Heater lamp on

Table A-12. CN9 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	5 VDC	—	+5 VDC
2	24 VDC	—	+24 VDC
3	GND2	—	Ground
4	NC	—	Not connected
5	SL2	O	Lower cassette solenoid on
6	S3	I	Lower cassette detected
7	PC4	I	Lower cassette paper empty

Table A-13. CN11 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	TH1	I	Thermistor
2	5 VDC	—	+5 VDC

A.1.3 Power Supply Board (PWB-E Board)

Table A-14. CN2 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	B	O	Ml phase B
2	24 VDC	—	+24 VDC
3	B	O	Ml phase B
4	A	O	Ml phase A
5	24 VDC		+24 VDC
6	A	o	Ml phase A

Table A-15. CN4 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	HI (L)	O	Heater power
2	NC	—	Not connected
3	HI (N)	—	Heater power

A.1.4 High Voltage Supply Board (PWB-F Board)

Table A-16. CN2 Pin Assignment

Pin No.	Signal Name	1/0	Description
1	24 VDC	—	+24 VDC
2	M3:CNT	o	M3 control

Table A-17. CN3 Pin Assignment

Pin No.	Signal Name	I/O	Description
1	5 VDC	—	+5 VDC
2	GND1	·	Ground
3	PC2	I	Paper take-up

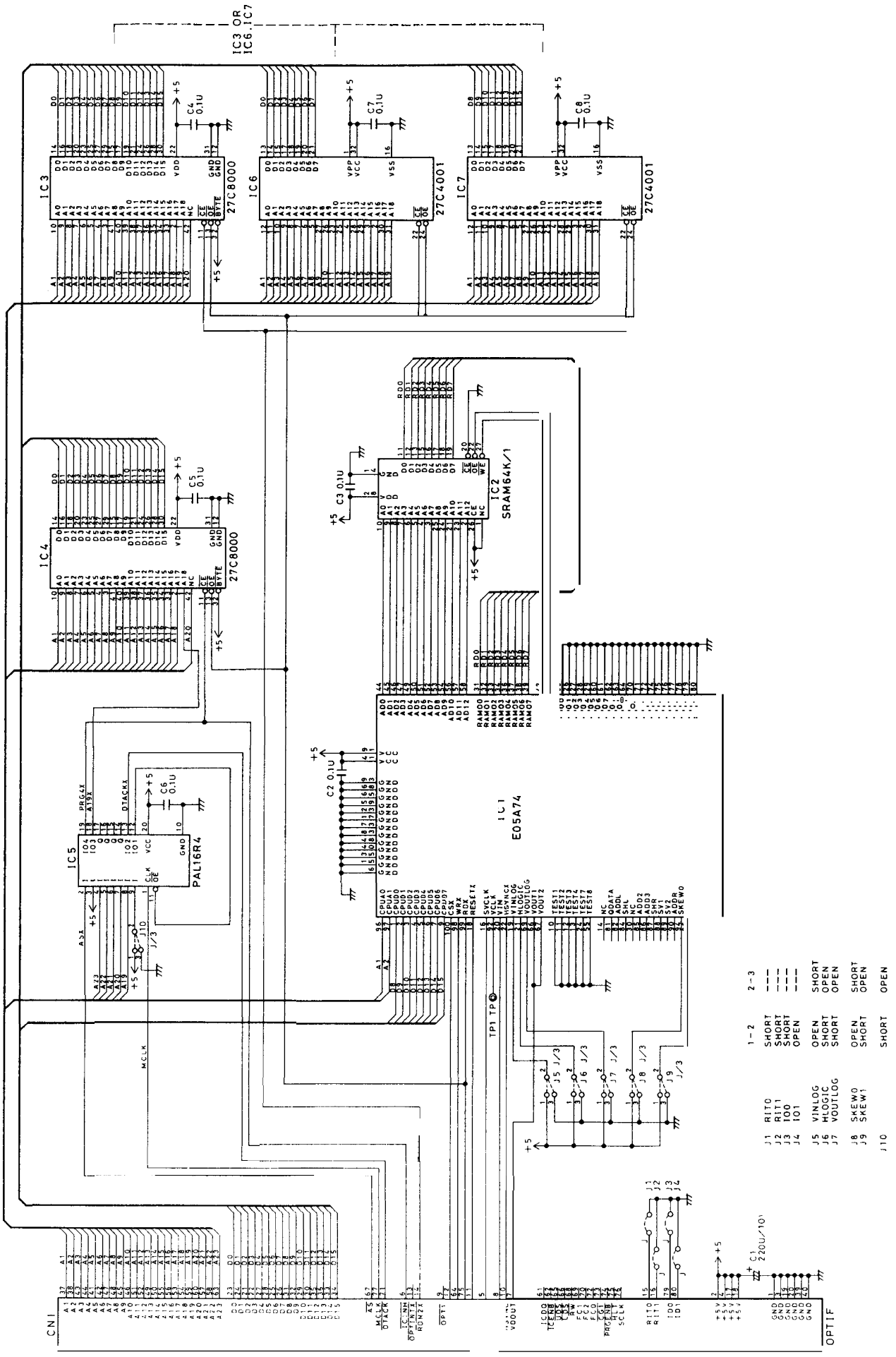

Figure A-4. C82907* ROM-B Board Circuit Diagram

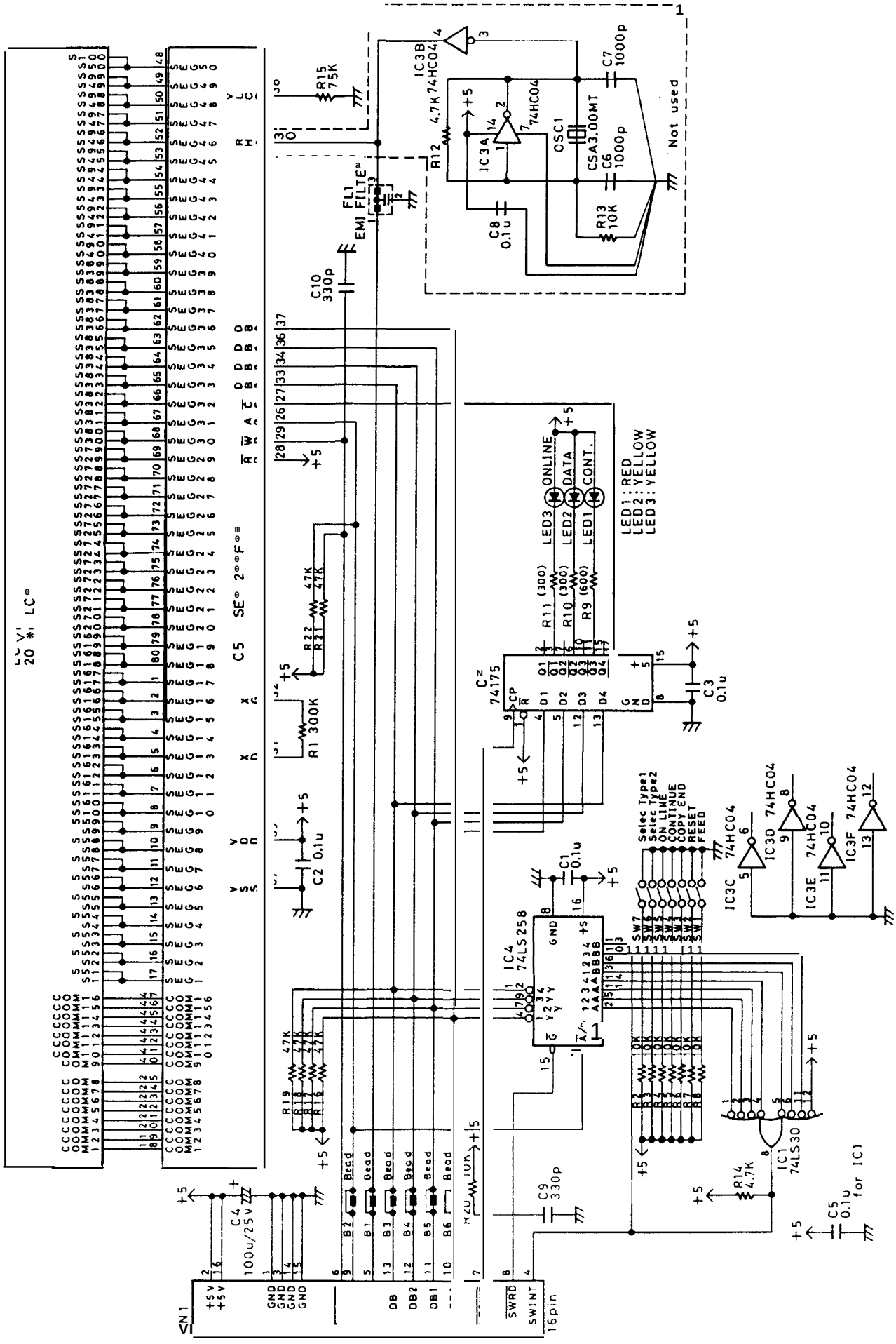

Figure A-5. Control Panel Circuit Diagram

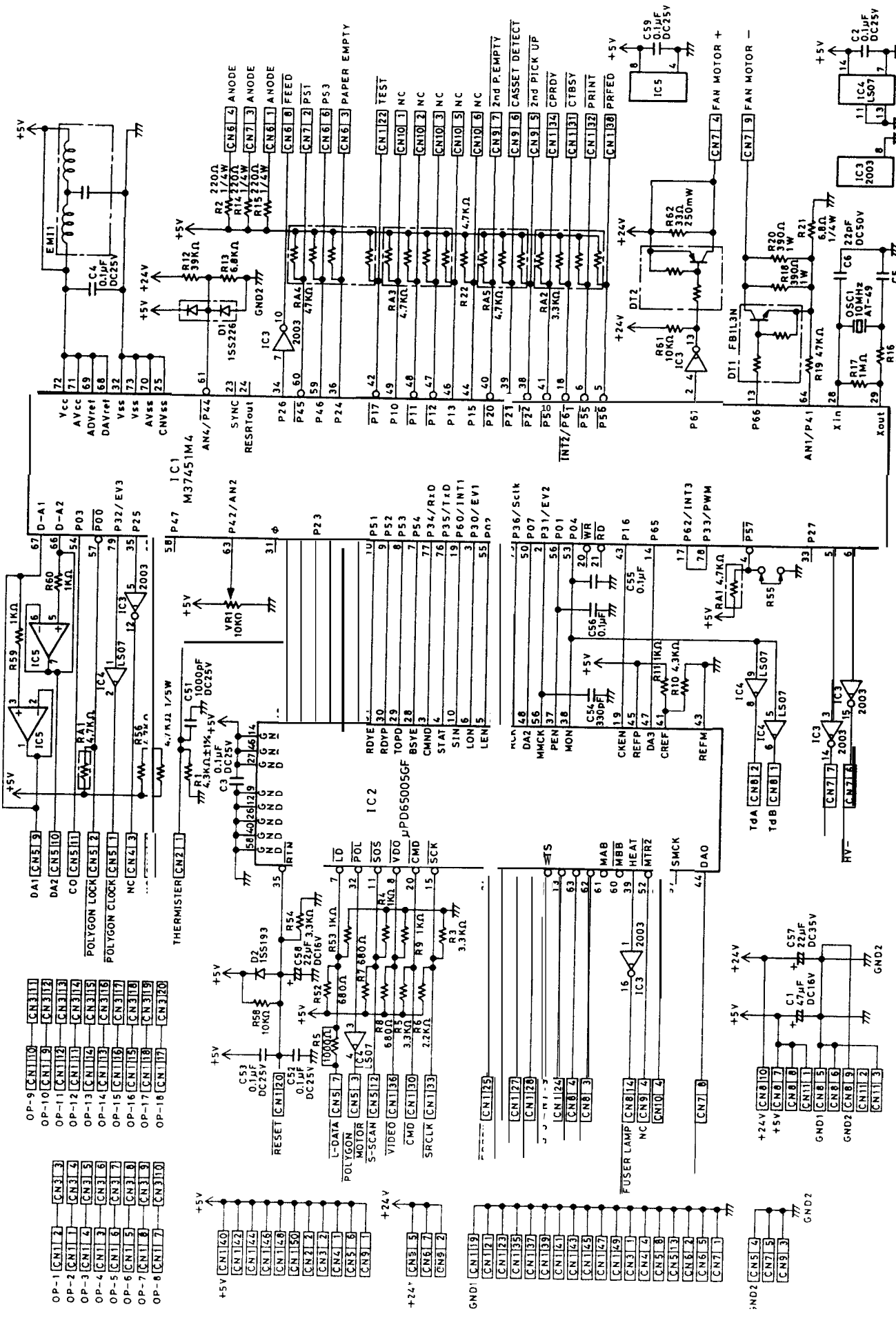

Figure A-6. PWB-A Board Circuit Diagram

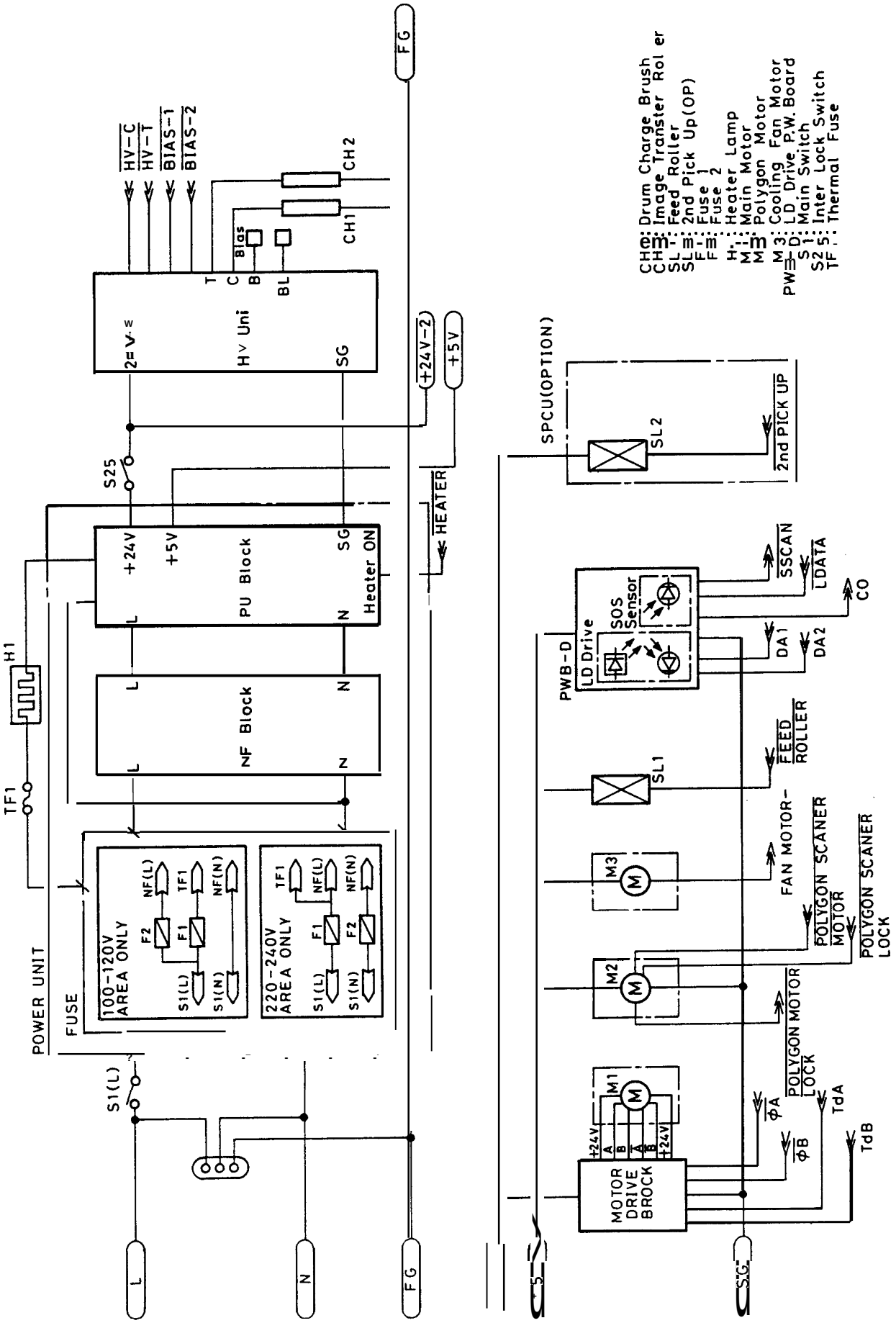

Figure A-7. Basic Circuit Diagram

A.3 CIRCUIT BOARD COMPONENT LAYOUT

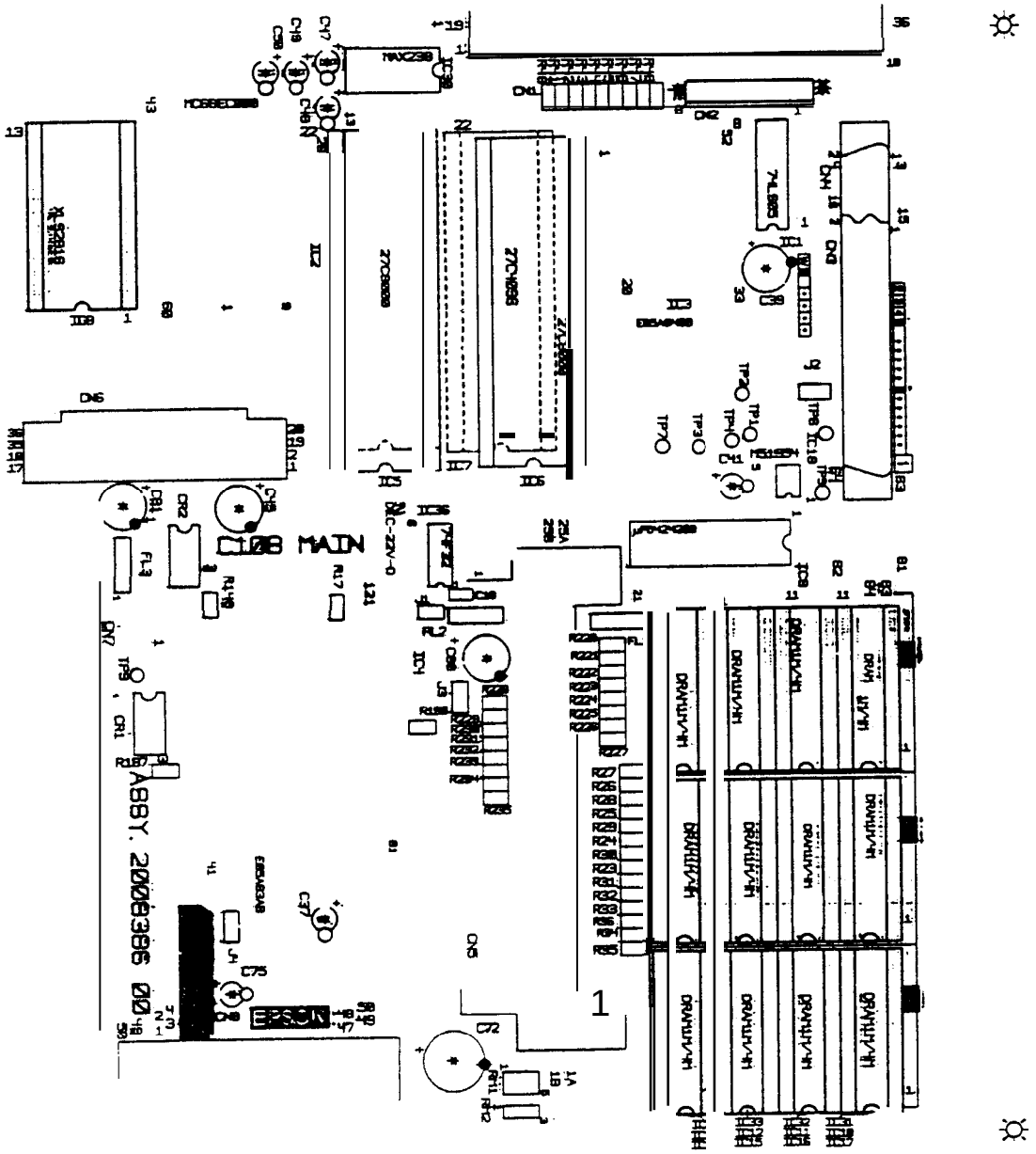

Figure A-8. C108 MAIN Board Component Layout (Front Side)

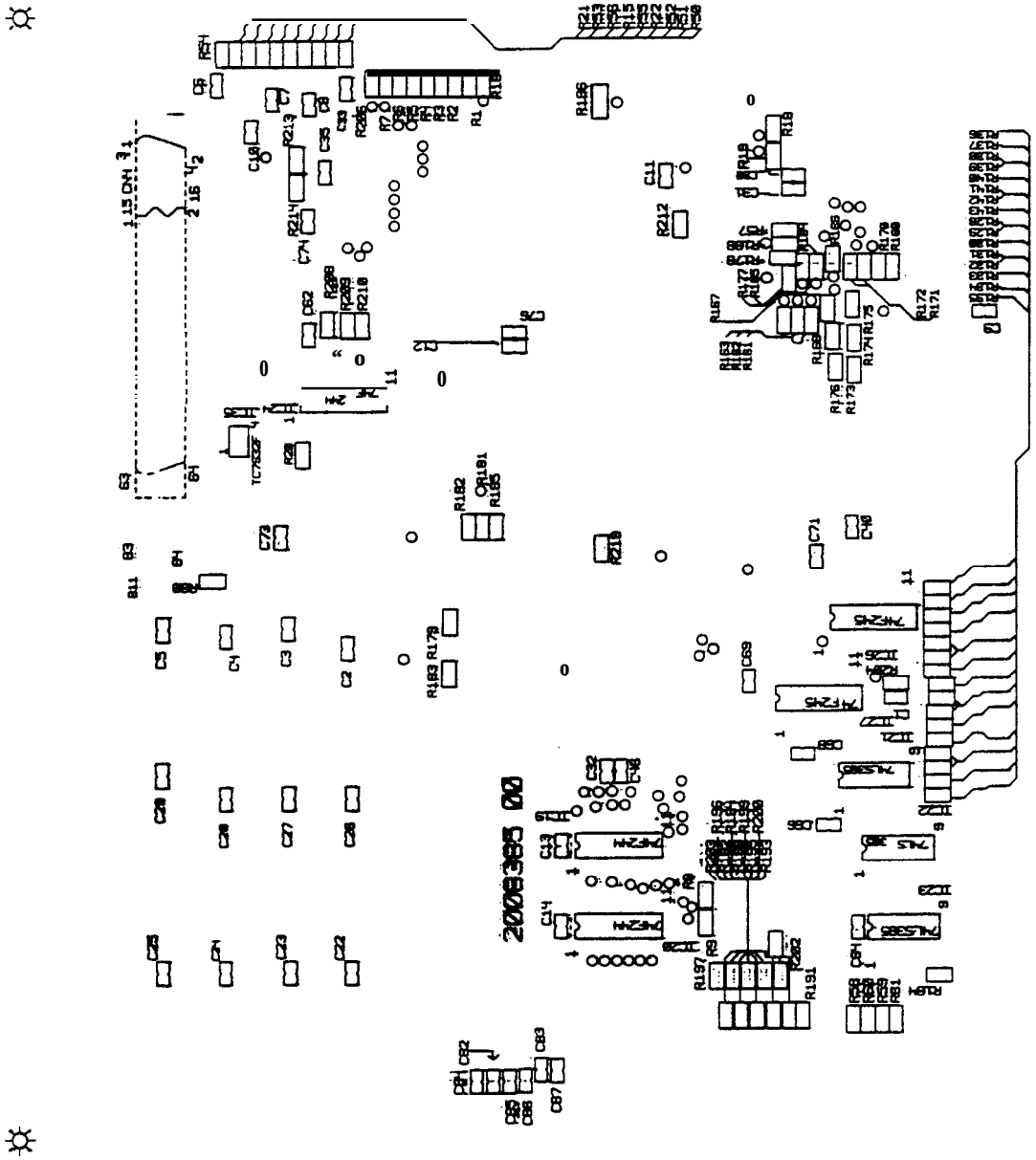

Figure A-9. C108 MAIN Board Component Layout (Back Side)

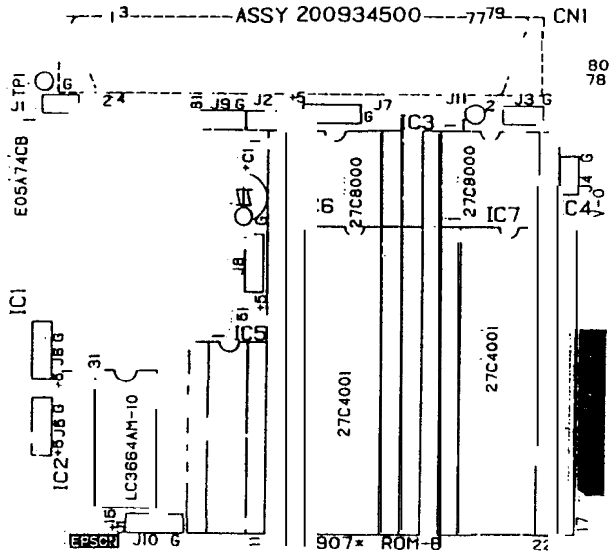

Figure A-10. C82907* ROM-B Board Component Layout (Front Side)

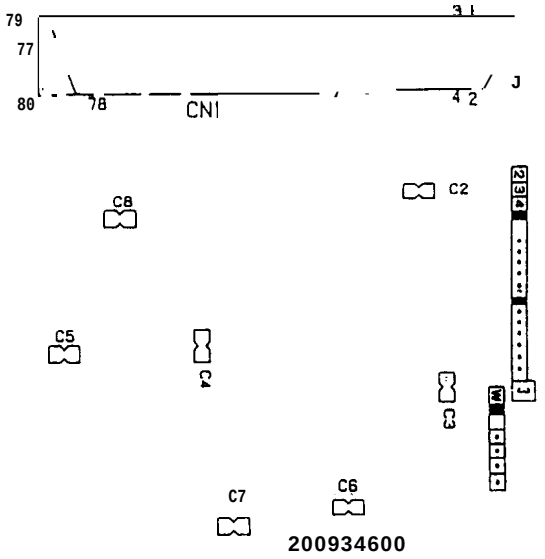

Figure A-Il. C82907* ROM-B Board Component Layout (Back Side)

Appendix B

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B.1 GENERAL INFORMATION

This chapter describes only differences between the current EPL-5200/ActionLaser 1500 and new EPL-5200/ActionLaser 1500. The new EPL-5200/ActionLaser 1500 is changed Video Controller Board. The current EPL-5200/ActionLaser 1500 used Video controller boards for C108 MAIN board and C82907* ROM-B board, and the new EPL-5200/ActionLaser 1500 used C108 W-B board only. The functions for C108 MAIN-B bead are same as the C108 MAIN board with C82907* ROM-B board. The specifications for new EPL-5200/ActionLaser 1500 and current EPL-5200/ActionLaser 1500 are same.

B.2 MAIN COMPONENTS

This section describes the C108 MAIN-B board.

6.2.1 C108 MAIN-B Board

The C108 MAIN-B board is video controller board. The functions of this board main are receiving print data from host, generating the print image (video), and sending the print image to the engine controller via the video interface. A M-bit 16.67 MHz CPU MC68000 (location: IC2) is used, and the following memory chips and custom ICs are assigned to the 16 MB memory space.

■ **Memory chips**

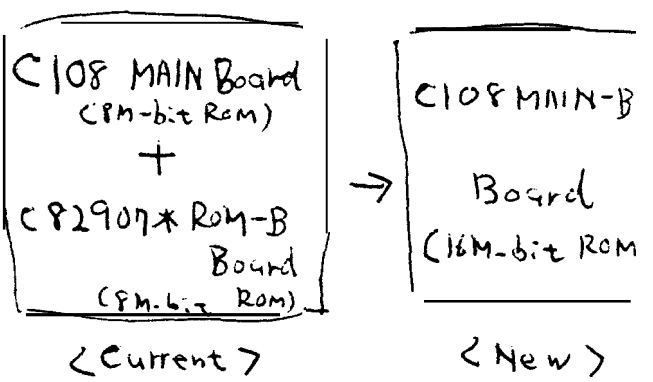
16 M-bit Mask ROM (IC5)
4 M-bit DRAM (IC9, IC104)
16 K-bit EEPROM (IC8)
64 K-bit SRAM

■ **Custom IC**

Standard cell E05A83 (IC4)
Standard cell E05A84 (IC3)
Standard cell E05A74 (IC1OO)

■ **Others**

Serial interface driver/receiver MAX238 (IC30)



There are two types of C108 MAIN-B boards used as after service parts. The following table shows differences in them.

Table B-1. Differences in Components for the C108 MAIN-B Board

	EPL-5200	Action Laser 1S00	EPL-5200 for Taiwan
Serial interface connector	Milli screw type connector	Inch screw type connector	Mini screw type connector
IC6	IC socket	None	IC socket
Connector CN3 and CN4	None	None	Connector
Board fixed pole	None	None	Three poles

B.3 C108 MAIN-B BOARD OPERATION

The operation for C108 MAIN-B board is same as operation for C108 MAIN board with C82907* ROM-B Board.

Figure El shows a block diagram of the C108 MAIN-B board. The C108 MAIN-B board contains the video controller, which consists of a 16-bit 68000 (16.67 MHz) CPU, the standard cells developed for this printer, DRAMs, ROM, and a 16K-bit EEPROM.

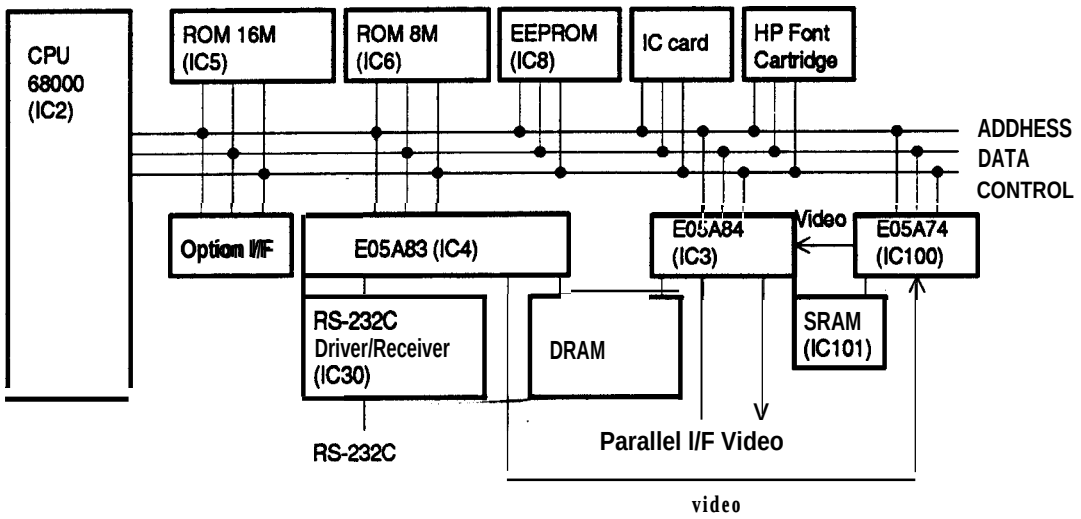


Figure B-1. C108 MAIN-B Board Block Diagram

Table B2 lists the functions of the C108 MAIN-B board main elements.

Table B-2. Functions of C108 MAIN-B Board Main Elements

Element	Location	Function
68000 CPU	IC2	The CPU, which operates at 16.67 MHz, manages the video controller operation.
;::*83'tandad	IC4	This standard-cell contains the following functions: . Interrupt control . Address decoding . Clock control . DRAM management (refresh control, RAS/CAS control) . Image processing . RS-232C interface . Control panel control . Video interface
E05A84 standard cell	IC3	This standard-cell contains the following functions: • Parallel interface . DRAM management, with the E05A83 . Video signal switching
E05A74 standard cell	IC100	RITech IC
16M ROM	IC5	This ROM stores the following: . Basic operating program . PCU5 (include EPSON GL/2) emulation mode program • LQ/FX emulation mode program . Fonts
8M ROM	IC6	This ROM is the GQ chip option (GQ mode program and GQ fonts) or the local language ROM (fonts) option (except in ActionLaser 1500).
EEPROM	IC8	This EEPROM stores the following: . Model type . Printed page counter value • Toner life counter value • SelecType setting
DRAM	IC9, 104, 10, 11, 12, 13, 17, 16, 15, 14	Standard DRAMs are IC9 and IC104 only; other DRAMs are options. These DRAMs are used as the working area of the CPU: input buffer, image buffer, etc.
64K SRAM	IC101	Working area for E05A74
RS-232C driver/receiver MA)(238	IC30	This IC changes the RS-232C signal level. (The ActionLaser 1000 does not have this IC.)

B.4 CONNECTOR PIN ASSIGNMENTS

Figures B-2 illustrate the interconnection of the primary components. Table B-3 gives the size and a description of each comector.

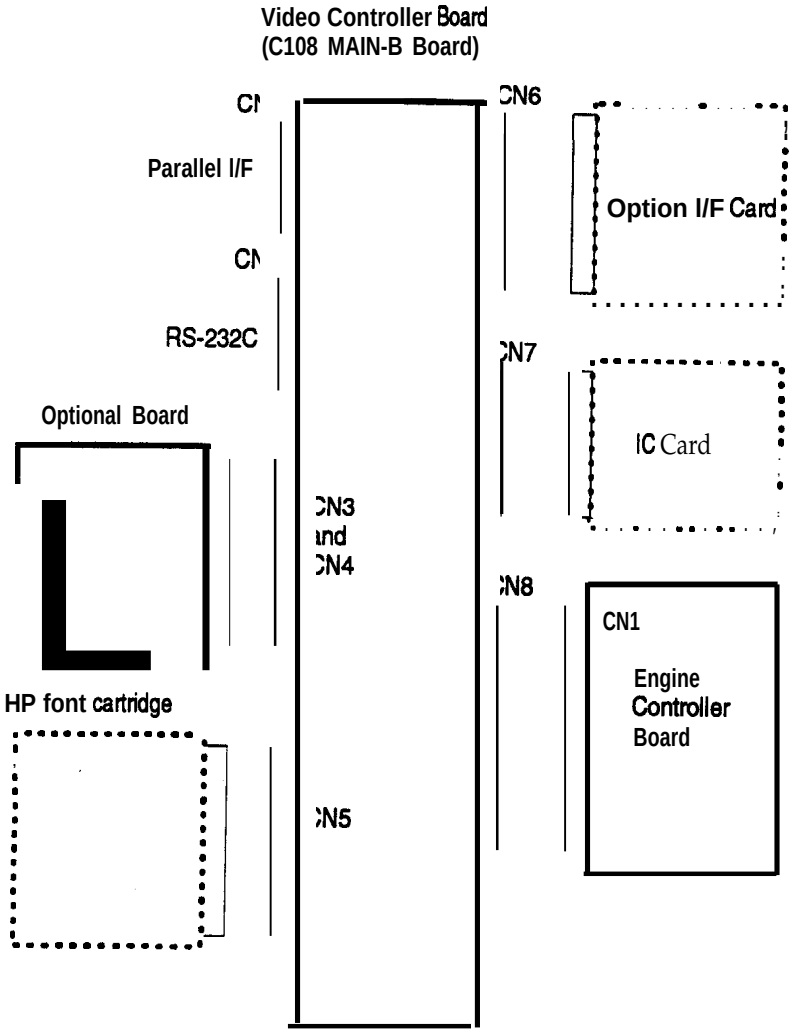


Figure B-2. Cable Connections for C108 MAIN-B

Table B-3. Board Connector Summary

Connector	Description	Pins	Reference
Video Controller Board (C108 MAIN-B Board)			
CN1	Centronics parallel interface	36 pins	Table 1-13
CN2	Serial (RS-232C) interface	25 pins	Table 1-14
CN3	Connector for optional board	84 pins	Table A-2
CN4	Connector for optional board	16 pins	Table A-3
CN5	Connector for HP font cartridge	50 pins	Table A-4
CN6	Connector for optional I/F (Type-B) card	36 pins	Table A-5
CN7	Connector for IC card	50 pins	Table A-6
CN8	Connector for engine controller board (PWB-A board)	50 pins	Table A-7
Engine Controller Board (PWB-A Board)			
CN1	Connector for video controller board (C108 MAIN-B board)	50 pins	Table A-7
CN2	Not used	—	—
CN3	Connector for control panel	16 pins	—
CN4	Not used	—	—
CN5	Connector for printhead unit	13 pins	Table A-8
CN6	Connector for paper take-up solenoid, paper exit sensor, and paper empty sensor	8 pins	Table A-9
CN7	Connector for high voltage supply board (PWB-F board)	9 pins	Table A-1 O
CN8	Connector forpowersupply board (PWB-E board)	11 pins	Table A-11
CN9	Connector for lower paper cassette	7Pins	Table A-12
CNIO	Not used	—	—
CN1I	Connector for thermistor	2 pins	Table A-1 3
Control Panel			
CN1	Connector for engine controller board (PWB-A board)	16 pins	—
Power Supply Board (PWB-E Board)			
CN1	Connector for AC power inlet	4 pins	—
CN2	Connector for main motor	6 pins	Table A-14
CN3	Connector for engine controller board (PWB-A board)	11 pin	Table A-1 1
CN4	Connector for heater lamp	3 pins	Table A-15
High Voltage Supply Board (PWB-F Board)			
CN1	Connector for engine controller board (PWB-A board)	9 pins	Table A-1 O
CN2	Connector for fan motor	2 pins	Table A-1 6
CN3	Connector for paper take-up sensor	3 pins	Table A-17

B.6 CIRCUIT BOARD COMPONENT LAYOUT

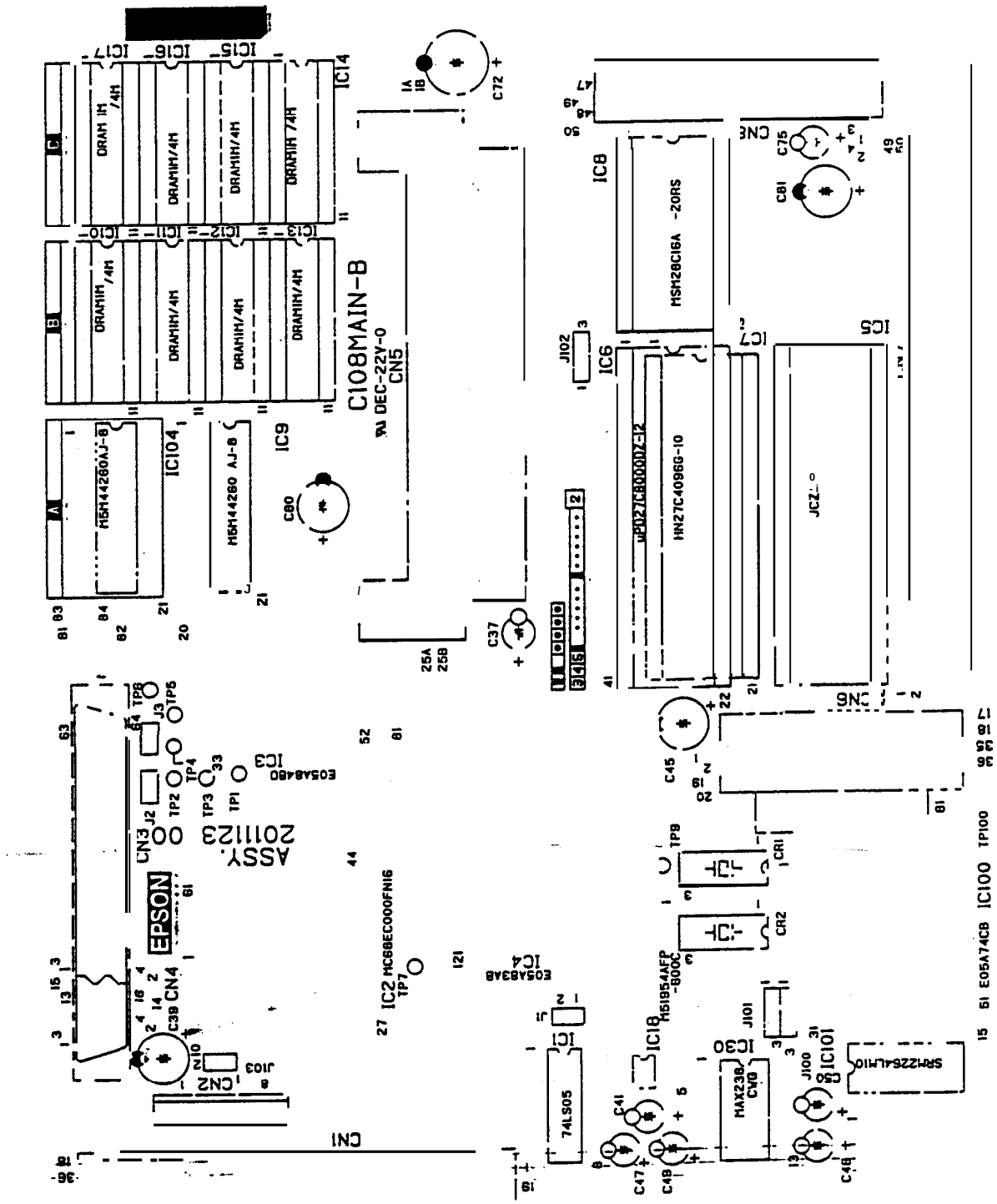


Figure B-4. CI08 MAIN-B Board Component Layout (Front)

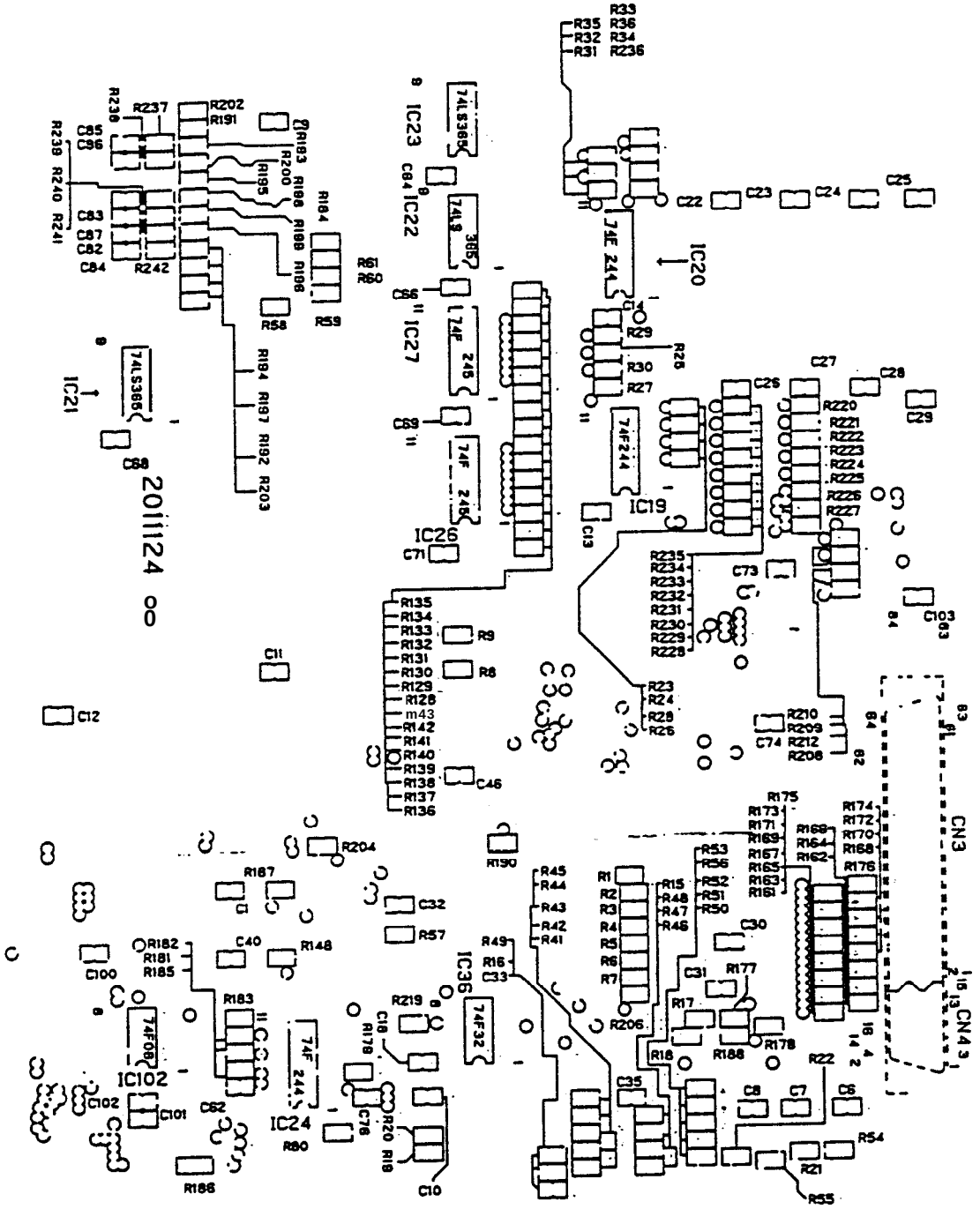


Figure B-5. CI08 MAIN-B Board Component Layout (Back)

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C.1 GENERAL INFORMATION

This chapter describes only differences between the current EPL-5200 and EPL-5200+. The EPL-5200+ is changed Video Controller Board and Control Panel. The EPL-5200+ supports PCL5e (HP LaserJet 4L emulation).

C.2 FEATURES

This section describes the features.

- EPL-5000/ActionLaser 1000 has HP LaserJet® 4L emulation mode
- 22built-unscalable fonts (14 Windows True Type and 8Agfafonts)
- Optional EPSONScript (PostScript" emulation) ROM SIMM or cartridge
- Bi-directional parallel interface
- High-performance controller (the controller's CPU is 20 MHz Motorola 68000)
- Toner save mode

Table C-1 lists the optional units available for the EPL-5200+

Table C-1. Options for EPL-5200+

Cat. No.	Description	Note
C83213*	EPSONScript Level 2 Module	ROM SIMM type PostScript level 2 emulation
C83212*	EPSONScript Level 2 Cartridge	Cartridge type PostScript level 2 emulation
--	GQ chip ROM	Supports GQ mode fonts and commands
..	Local language ROM	Supports local language fonts
C812302	*250* sheet lower paper cassette (A4)	Lower paper cassette
C81231*	Face-up tray	--
SO51O11	Imaging cartridge	Toner cartridge
C82307*/ C82308*	32KB serial interface card	--
C8231O*I C82311•	32KB parallel interface card	..
C82312*	LocalTalk™ card	..
C82313*	32KB IEEE-488 interface card	..
C82314*	COAX interface card	..
C82315*	TWINAX interface card	..

C.3 SPECIFICATIONS

This section provides statistical data for the EPL-5200+

Built-in modes: HP LaserJet 4L emulation (PCL5e)
EPSON GL/2 mode (LJ4L-GL/2 mode and GL-like mode)
FX (FX-800/1000) emulation mode
LQ (LQ-2500) emulation mode

Optional modes: EpsonScript level 2 (PostScript level 2) emulation

Built-in fonts: See Table C-2.

Table C-2. Built-in Fonts

Resident Fonts			Applicable Mode	
			HP W4L	ESC/P®
Bitmap fonts				
Line printer	16.66 cpi	Portrait	S	S
Courier	10 cpi	Portrait	S	S
Courier	12 cpi	Portrait	S	S
Presitage	12 cpi	Portrait	NS	S
Presitage	20 cpi	Portrait	NS	S
Scalable fonts				
Dutch™ 801	Roman SWC		S	NS
Dutch 801	Bold SWC		S	NS
Dutch 801	Italic SWC		S	NS
Dutch 801	Bold Italic SWC		S	NS
Swiss™ 742	SWC		S	NS
Swiss 742	Bold SWC		S	NS
Swiss 742	Medium Italic SWC		S	NS
Swiss 742	Bold Italic SWC		S	NS
Swiss 721	Roman SWM		S	NS
Swiss 721	Bold SWM		S	NS
Swiss 721	Oblique SWM		S	NS
Swiss 721	Bold Oblique SWM		S	NS
Dutch 801	Roman SWM		S	NS
Dutch 801	Bold SWM		S	NS
Dutch 801	Italic SWM		S	NS
Dutch 801	Bold Italic SWM		S	NS
Symbol Set	SWA		S	NS
More WingBats	SWM		S	NS
Courier	SWC		S	NS
Courier	Bold SWC		S	NS
Courier	Italic SWC		S	NS
Courier	Bold Italic SWC		S	NS

S: Supported, NS: Not Supported

C.4 INTERFACE SPECIFICATIONS

The EPL-5200+ is equipped with the following external interfaces:

- Centronics® bi-directional parallel interface
- Optional Type B interface

The bi-directional parallel interface specifications of EPL-5200+ is same as EPL-3000. (Please refer to EPL-3000 SERVICE MANUAL)

C.5 OPERATING INSTRUCTIONS

This section describes the functions performed through the control panel, such as test print, hexadecimal dump, and SelecType functions.

C.5.1 Control Panel

The printer control panel gives you easy control over most common printer operations. The panel consists of a liquid crystal display (LCD), indicator lights, and buttons.

Display (LCD)

A 20-character (5 x 7 dot matrix) by l-row liquid crystal display (LCD) unit that indicates printer status. A variety of printer parameters can be displayed and set using SelecType mode.

Indicator lights

■ ONLINE

ON: Communication with the host is possible.

OFF: Communication with the host is impossible.

Flashing: This state occurs when the system cannot shift from off line to on line, or vice versa.

■ FEED

This LED indicates the data processing condition for each interface channel: S, P, and O.

ON: Indicates that received data is stored in the printer that has not been printed out. However, the LED does not light up when only non-printable data (commands and other control codes) is stored.

OFF: Indicates there is no printable data remaining in the printer.

Fast flashing: Indicates that the printer is in the process of receiving data from the host.

Slow flashing: Indicates data has arrived on a non-active channel (in auto-sense operation).

■ **CONTINUE**

Flashes when an error is detected or a maintenance procedure is needed. An error message appears on the display at the same time.

Buttons

■ ON LINE/EXIT

ON LINE: This button switches the printer between on line and off line mode. This button is invalid in SelecType mode, but is effective in the hex dump mode.

EXIT: Exits SelecType mode.

■ SelecType

LEVEL 1: Enters SelecType Level 1.

LEVEL 2: Enters SelecType Level 2.

If printer power is turned on while this button is pressed, the printer enters hex dump mode. (All channels are switched to hex dump mode.) This button is invalid once the printer enters the hex dump mode.

■ RESET / INITIALIZE

RESET: Holding down this button until RESET appears on the display causes the printer to finish printing the current page and then stop. The remaining data is discarded, and some SelecType Level 1 settings return to their previously saved value.

INITIALIZE: Continuing to hold this button down after RESET appears causes the message to change to INITIALIZE. This function clears received print data and returns SelecType Level 1 and 2 settings to their power-on settings.

Holding down this button while turning on the printer, causes FACTORY RESET to appear on the display, and all SelecType settings return to the factory settings.

■ COPY END

Cancels the remaining copies when multicopy printing is selected and the printer is off line.

■ CONTINUE/IES Mode Change

CONTINUE: Pressing this button when the CONTINUE LED is flashing clears an error.

IES Mode cahnge: In IES mode, you can change the initial mode (EpsonScript or other mode).

■ FEED/ Toner Save

FEED: When the printer is off line and the FEED light is lit, press this button to print out data in the printer's memory.

Toner Save: When the printer is on lin, press button to enter the toner save mode.

C.5.2 Optional Memory

If you have difficulty printing complex, graphics-intensive pages of if you regularly use downloaded fonts, you may need to install the optional RAM SIMM sets on this printer's controller board. Theprinter's controller board comes with either 1.0MB of RAM installed.

By installing additional SIMM, you can increase the printer's memory to a total 5MB, including the resident memory.

EPSON supplies several types **of SIMM memory options. Other SIMMs can be purchased from other vendors. Be sure that the SIMM meets the requirements listed below.**

- **72-pin type**
- **Capacity is oneofthe following: 1MB, 2MB, 4MB**
- **Access speed is less than 70 ns.**
- **Size is within the following dimensions:**
  36 mm (1.42 in.) X 108 mm (4.25 in.) X 10 mm (.39 in.) (H X W X D)

C.5.3 EEPROM Reset

EEPROM reset operations are only required when the main board replacement, EEPROM replacement, or firmware version is revised, and these operations are specified in the accompanying documentation.

- **EEPROM memory reset (excluding clearing of the page counter and toner counter)**

  Turn on the power while pressing the ON LINE, FEED, and CONTINUE buttons simultaneously, the printer enters EEPROM clear mode, and the message START UP ERROR is displayed on the LCD. Press the right cursor button. All settings stored in EEPROM are replaced with the factory default settings, except the page counter and the value for toner left in the imaging cartridge.

- **EEPROM memory all clear (including clearing of thepagecounter and toner counter)**

  Turn on the power while pressing the ON LINE, FEED, and CONTINUE buttons simultaneously. Afterward, both the page counter and toner counter can be cleared by pressing either the right cursor button and holding down the CONTINUE button, while the message START UP ERROR is displayed on the LCD.

C.6 DIFFERENCES IN COMPONENTS

The different components are main board and control panel. The EPL-5200 is used C108 MAIN-B board, and the EPL-5200+ is used C154 MAIN-B board.

The C108 MAIN-B board and the C154 MAIN-B board are same function. The differences between parts in the C108 MAIN-B board and the C154 MAIN-B board areas following table.

Table C-3. Differences in Main Board

Parts	C108 MAIN-B	C154 MAIN-B
CPU clock	16.7 MHz	20.0 MHz
CPU	68EC000	E05B05 (Include 68 EC000, E05A74, E05A83, E05A84, and toner save function)
ASIC	E05A74, E05A83, E05A64	
Code ROM	EPL-5200 program with CG data ROM	EPL-5200+ program ROM
CG mask ROM		M80A99

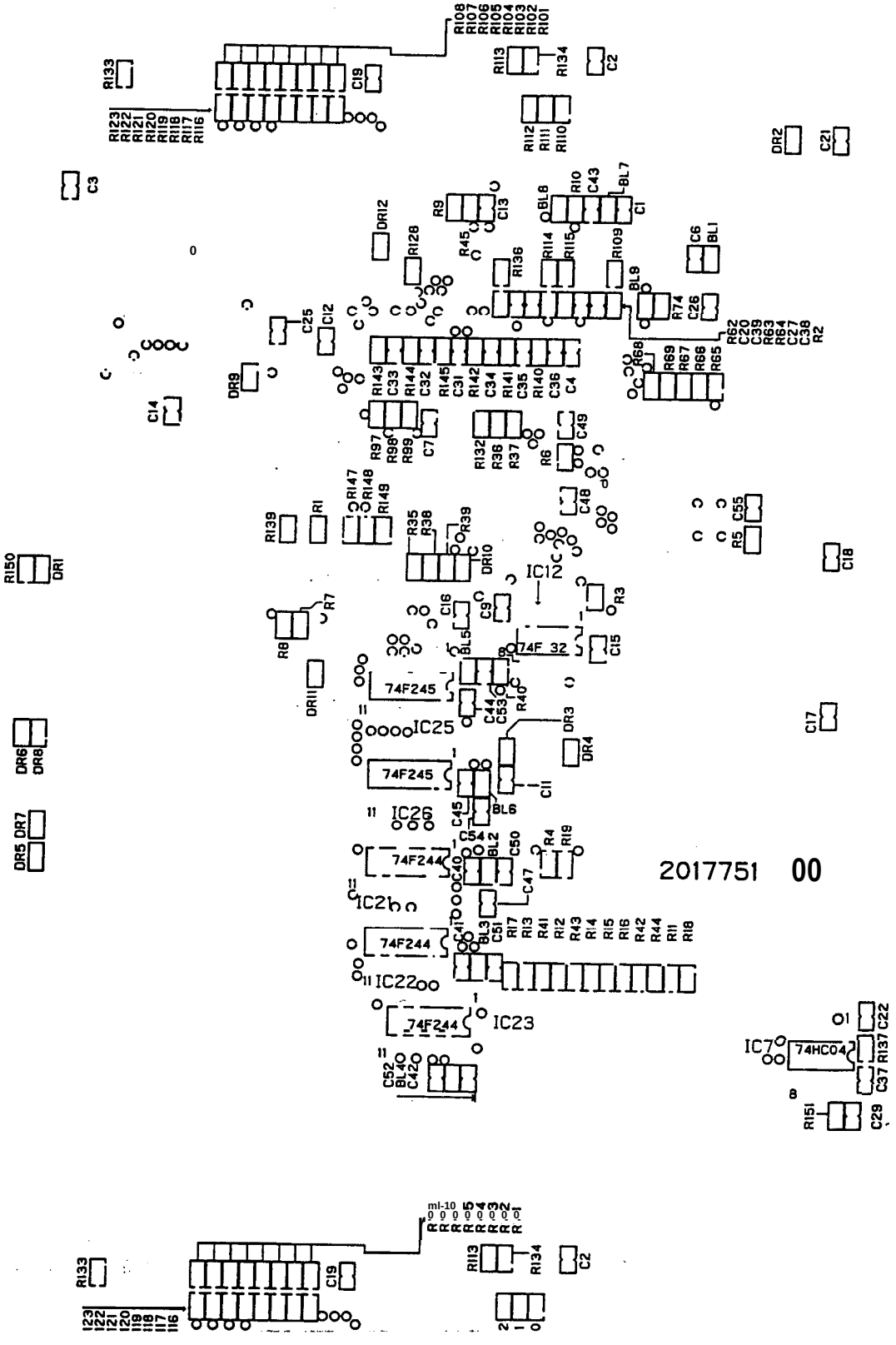

Figure C-2. C154 MAIN-B Component Layout (Front)

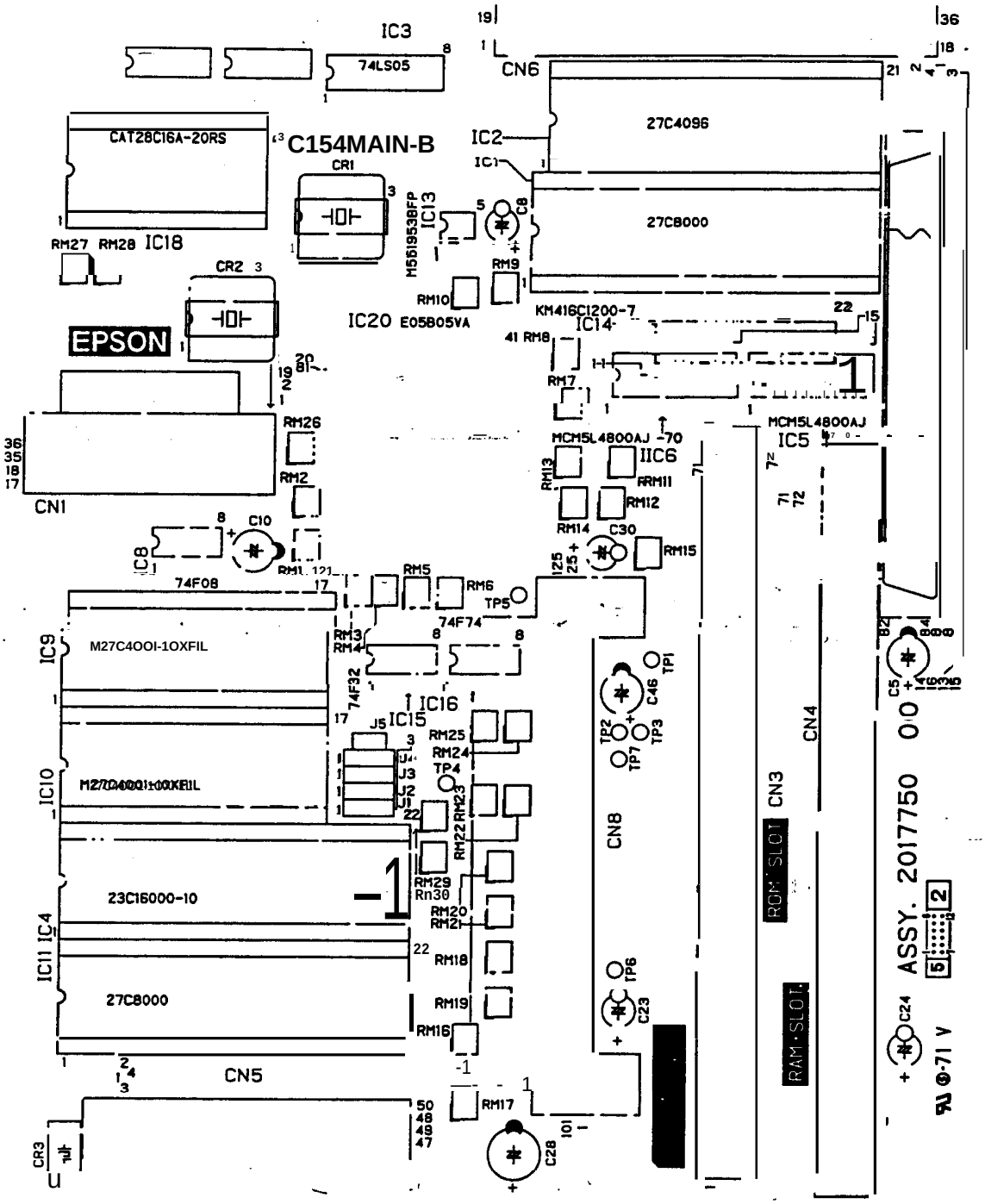

Figure C-3. C154 MAIN-B Component Layout (Rear)